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THE LOWER MIOCENE MAMMAL FAUNA OF FLORIDA

BY THEODORE E. WHITE

WITH FOURTEEN PLATES

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By Theodore E. White

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1. PALAEONTOLOGY

PREFACE

In the Spring of 1931, Mr. Clarence Simpson of the Florida State Geological Survey discovered some fragments of bone on the dump of an abandoned well on the Raeford Thomas farm, 8 miles north of Bell in Gilchrist Co., Florida. Later in the same year he opened a pit about 60 feet west of the old well. From this pit he obtained some vertebrate fossils which were studied by Dr. G. G. Simpson of the American Museum of Natural History. Pure science had to give way to economic research in the Florida Survey, however, and the work in this area was set aside for an indefinite period. In 1938, Dr. Thomas Barbour, who had spotted the specimens in the Museum of the Florida Survey in Tallahassee, was given permission to continue the excavation. The next year, accompanied by Mr. and Mrs. William E. Schevill, he found and reopened the site and obtained some additional material. The Museum of Comparative Zoölogy has worked at this locality each year since, and plans to do so as long as the returns justify the expenditures. From the beginning the Museum has enjoyed the cordial cooperation of the Florida State Geological Survey.

I would like to call attention to Dr. Thomas Barbour's contribution to science in this enterprise. He initiated the reopening of the quarry and has been an enthusiastic supporter from the beginning. Credit is due, not so much that he gambled and won, but that he continued to gamble, in the face of adverse returns, on a project in which he had faith, for the results of the first year's work were not reassuring, nor were those of the second. It was not till the third year that the richness of the deposit and the scientific value of the fauna became apparent. In 1940 Dr. Barbour bought forty acres of land about the location of the excavation on the Thomas Farm from the Georgia Loan and Trust Co. in Macon, Georgia, which years ago had foreclosed a mortgage on the property. This land has now been deeded to the University of Florida at Gainesville under certain stipulations concerning its use by representatives of Harvard University, the University of Florida, or the State Geological Survey. Acknowledgment is also due to the Committee on the Milton Fund of Harvard University as well as to those of the Marsh Fund and the Bache Fund of the National Academy of Sciences for grants which have cared for part of the expenses in connection with the excavations and the preparation of the material.

Many helpful suggestions on the local geology and the paleogeography have been given by Prof. P. E. Raymond, Mr. H. C. Stetson, and Mr. Frank Whitmore.

The intelligent observations of specimens during preparation have made Mr. Russell Olsen's contribution very much more than an exhibition of manual skill.

The superior quality of the graphic art of Mr. Eugene N. Fischer has portrayed the characters of the specimens much better than many printed pages.

The citations to literature relative to the fauna are given in the text. That prior to 1935 is given by year and letter corresponding to that in the published bibliographies. For material written since that date full reference is given.

SYSTEMATIC LIST

CARNIVORA

The Carnivora range in size from a small mustelid, no larger than a weasel, to the huge *Amphicyon*, as large as a grizzly. To date six genera, embracing eight species, have been identified. At least half as many more species are represented by material which will not permit even generic identification.

MUSTELIDAE

Mephititaxus ancipidens White

Proc. New Eng. Zool. Club, **18**, p. 92, Pl. 14, figs. 1 and 2, 1942.

Unfortunately no additional material referable to this species has been found. In addition to this form, four genera of Mustelidae are known from fragmentary material. Two of the genera are represented by lower jaws without teeth and two by lower carnassials which cannot fit either of the jaws. Also there are three isolated first upper molars which may or may not represent one of the above genera.

CANIDAE

Daphaenus caroniavorus spec. nov.

Type. M.C.Z. 3727 (Plate 1, fig. 1), left M^{1-3}.

Horizon and Locality. Lower Miocene, L. Arikareean; Thomas Farm, Gilchrist Co., Florida.

Diagnosis. About the size of *D. hartshornianus*, protocone of M^1 less well developed, paracone and metacone conical and larger, medial portion of tooth broader, protocone and metacone of M^2 vestigial, paracone larger, medial end of tooth as broad as lateral, M^3 button-like.

This species is only provisionally referred to this genus. The teeth appear to be somewhat degenerate, and when it becomes better known it may be necessary to erect a new genus for it.

Paradaphaenus nobilis (Simpson)

Plate 2, fig. 1; Plate 3

Cynodesmus nobilis Simpson. Fla. State Geol. Survey, Bull. 10, p. 17, fig. 1, 1932.

Two skulls, a nearly complete jaw, and several fragmentary jaws are referred to this species. Except for *Amphicyon* this is the largest canid yet found in the Florida Miocene. It is very nearly the same size as *Cynodesmus thoöides* Scott.

Paradaphaenus tropicalis spec. nov.

Type. M.C.Z. 3729 (Plate 1, fig. 2), right half of palate with P^4–M^2.

Paratype. M.C.Z. 3714 (Plate 4), left mandible with P^4–M^2.

Horizon and Locality. L. Miocene, L. Arikareean; Thomas Farm, Gilchrist Co., Florida.

Diagnosis. One-seventh (15%) smaller than *P. nobilis*, protocone and metacone of M^2 better developed, hypocone reduced.

Two skulls, a crushed rostrum, and some fragmentary jaws are referred to this species.

I have placed these two species in this genus on the character of the heel of M_1. Cope (1884 O, p. 900) says of *Amphicyon cuspigerus:* "The inferior sectorial tooth is characterized by its great robustness; the internal medial tubercle is much elevated, while the principal cusp is short. The heel is wide and basin-shaped, with the inner border as much elevated as the outer." Wortman and Matthew (1899 A, p. 129) made this species the type of a new genus, *Paradaphaenus*. Scott's figure (1895 C, Pl. 1, Fig. 5) shows the entoconid of M_1 as very much smaller than the hypoconid. Since the entoconid and hypoconid are nearly equal in *nobilis* and *tropicalis*, their affinities are with *Paradaphaenus* rather than *Cynodesmus*. The latter genus appears to be restricted to the Upper Miocene and the former is otherwise known only from the Upper John Day.

Amphicyon intermedius White

Proc. New Eng. Zool. Club, **18**, p. 32, pl. 3–4, 1940.

Skeletal material and isolated teeth are the only additional material referable to this species. Its affinities are somewhat confused by the combination of advanced and seemingly retarded characters.

Amphicyon longiramus spec. nov.

Type. M.C.Z. 3919 (Plate 5), right mandible with P_2–M_2.

Horizon and Locality. L. Miocene, L. Arikareean; Thomas Farm, Gilchrist Co., Florida.

Diagnosis. Size and proportions very close to the jaws with skull referred by Matthew (1924 C) to *A. sinapius*, P_1 and M_3 single rooted, M_3 with groove in the outer side of root but not on the inner side, P_4 with heel and accessory cusp, two mental foramina.

Measurements

Length, condyle to incisors	328
" P_1 to M_3	153
" M_1	32
" M_2	23
" diastema C to P_1	18
" " P_1–P_2	6
" " P_2–P_3	10
Depth of jaw at posterior border of M_2	60

This species is about one fourth larger than the preceding, and differs from it also in the double rooted P_2 and in the single rooted M_3.

In dental characters, in size, and in the relative proportions this form is difficult to distinguish from the jaws from the Snake Creek beds referred by Matthew (1924 C) to *A. sinapius* Matthew, and perhaps does not merit specific designation.

One of the peculiar features of this individual is that P_4 developed but failed to erupt. The tip is gone from the tooth and perhaps was injured while the tooth was forming.

This genus presents many of the characteristics of being a hyperpituitary *Daphaenus*. In fact, size is the principal character which separates the two genera. It seems to me that M^3 of *Daphaenodon* is too much reduced for that genus to stand intermediate between *Daphaenus* and *Amphicyon*. It is more logical that it should be intermediate between *Daphaenus* and *Cynodesmus*.

Nothocyon insularis spec. nov.

Type. M.C.Z. 3812 (Plate 1, fig. 3), right P^{4-2}.

Referred Material. Portion of left maxilla with P^4, an isolated unerupted M^1, and a left mandible with M_1.

Horizon and Locality. L. Miocene, L. Arikareean; Thomas Farm, Gilchrist Co., Florida.

Diagnosis. A large species of *Nothocyon*, metaconule of M^{1-2} well developed, hypocone of M^1 conical with faint ridge anteriorly and posteriorly, hypocone of M^2 elongate antero-posteriorly, postero-lateral angle of M^2 nearly a right angle and not obtuse as *Tomarctus*. The lower jaw referred to this species is rather slender and lightly built. The first molar is the only tooth preserved but the distribution of the

sockets indicate that the anterior premolars were spaced. The cusps of M_1 do not differ from those of *Tomarctus*.

Measurements

	M^1	M^2
Length x Width	11.3 x 13.5	7.5 x 10.8

This species is provisionally referred to *Nothocyon* because of the spacing of the first and second molars, the quadrangular M^2, and the conical hypocone on M^1. It may eventually prove to be a primitive species of *Tomarctus*. It is well advanced toward that genus, however, but in nearly all species of that genus the postero-lateral angle of M^2 approaches one-hundred and thirty-five degrees. This species is about the same size as *Tomarctus thomsoni*, but M^1 is much narrower medially.

Tomarctus canavus (Simpson)

Plate 2, fig. 2; Plate 6

Cynodesmus canavus Simpson. Fla. State Geol. Survey, Bull **10**, p. 19, fig. 4, 1932.

A crushed skull with P^4 to M^1 of both sides, a right mandible (M.C.Z. 3628) with P_2 to M_1, and a jaw fragment with P_4–M_1 are referred to this species.

This form is only slightly larger than *T. thomsoni* but does not have the broad medial end of M^1 of that species. M^2 is missing but the sockets indicate that the postero-lateral angle of this tooth is the greatest in this form of any of the species of *Tomarctus*. In the lower jaw the premolars are spaced as in *Nothocyon* and probably were in the upper jaw.

Tomarctus thomasi White

Plate 7

Proc. New Eng. Zool. Club, **18**, p. 94, pl. 14, fig. 3, 1941.

A crushed skull (M.C.Z. 3728) with nearly all of the teeth, a palate with most of the teeth, and a right lower jaw (M.C.Z. 3712) with P_2 to M_2 are referred to this species.

This species is not much larger than the preceding (6% as indicated by the molar-premolar length), but the individual teeth are about 12% larger and are crowded together as in *T. brevirostris*. As near as can be determined from the crushed skull with unworn teeth this species is very close to the skulls figured by Matthew (1924 C) and referred to *T. brevirostris*.

It seems reasonable to suppose that Matthew (1930 E) had the species *thomsoni* and *minor* in mind when he placed *Cynodesmus*

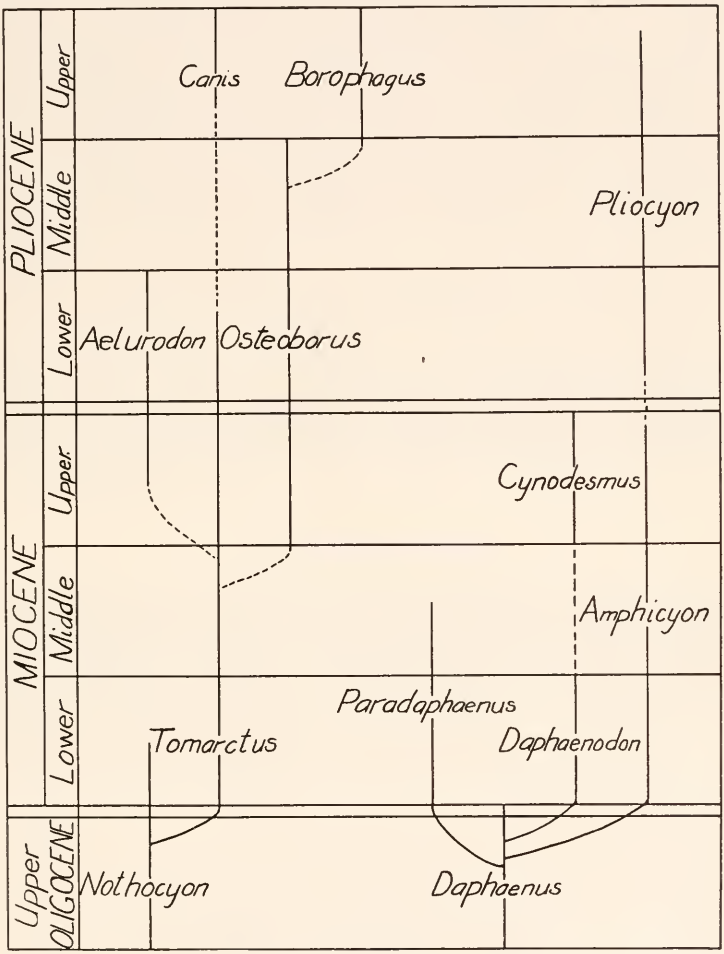

Fig. 1. Diagrammatic representation of the relationships of a few genera of American Tertiary dogs. Modified from Matthew (1930) and, Vanderhoof and J. T. Gregory (1940).

between *Nothocyon* and *Tomarctus* in his phylogenetic arrangement. Since these and other species have been removed from *Cynodesmus*,

it has become a monotypic genus. Certainly the affinities of *Cynodesmus thoöides* Scott are closer to *Daphaenodon* than to *Nothocyon*. In the light of the recent taxonomic changes (Vanderhoof and J. T. Gregory, Univ. Calif. Bull. Dept. Geol. Sci., **25**, p. 160, 1940; and White, Proc. New Eng. Zool. Club, **18**, p. 95, 1941.) it seems desirable to make some modifications in the graphic representation of the relationship of these genera. See Text fig. 1, which is modified from Matthew (1930 E) and Vanderhoof and J. T. Gregory (ibid, p. 145).

Two genera, *Paradaphaenus* and *Nothocyon*, of the fossil dogs found in this deposit are restricted to the Upper John Day and the Lower Rosebud of the great Plains. Two species of *Tomarctus* are present, one *T. canavus*, exhibits a less advanced character in the small size and in the spacing of the premolars, and the other appears to be more advanced and very similar to *T. brevirostris*. One of the species of *Amphicyon* (*A. longiramus*) is very advanced and very close to *A. sinapius* of the Middle and Upper Miocene. The affinities of the other species are not altogether clear. The specimen referred to *Daphaenus* appears to be somewhat degenerate and therefore worthless for correlation. On the whole the Canidae exhibit a basal Miocene aspect.

ARTIODACTYLA

While there is considerable variety among the artiodactyls (eight species and as many genera) found in these deposit, certain groups are conspicuously absent (Entelodontidae, Merycoidodontidae, and Agriochoeridae). Since they are so abundantly represented in the Miocene deposits of the Plains it seems reasonable to suppose that they did not inhabit Florida at this time. Of the artiodactyls present only the Cervidae and the Protoceratidae are represented by more than one specimen in each species.

TAYASSUIDAE

Floridachoerus olseni White

Proc. New Eng. Zool. Club, **18**, p. 96, pl. 14, fig. 4, 1941.

A few isolated teeth are the only additional material of this species found. It appears to be more advanced than *Desmathyus* and less so than *Prosthenops*.

CAMELIDAE

Oxydactylus floridanus Simpson

Fla. State Geol. Survey, Bull. **10**, p. 35, figs. 20–21, 1932.

No additional material certainly referable to this form has been found. Concerning the affinities of this species Simpson (1932 D, p. 16) says: "*Oxydactylus floridanus* belongs to a lower Miocene group, so far as its affinities can now be read, and appears to be a rather advanced member of that group. The Midway camels seem to be somewhat more progressive, although the evidence is very poor, and this may be illusory".

Paratylopus grandis White

Proc. New Eng. Zool. Club, **18**, p. 33, pl. 5, 1940.

No additional material certainly referable to this species has been found. Isolated molars and premolars are rather common, but it is difficult to be certain whether they belong to this form or to *Oxydactylus*. This is the largest species of this genus known, but its affinities are not altogether clear.

HYPERTRAGULIDAE

There are three genera of this family represented, all of which seem to be peculiar to this deposit. The smallest and more nearly normal is represented by a fragment of a right mandible with Dp_{2-3} and M_1. It seems better to withhold a specific diagnosis until better material is obtained.

Hypermekops genus nov.

Genotype. olseni spec. nov.

Diagnosis. A large brachyodont hypertragulid with three incisors in the premaxillary, fourth premolar and molars similar in form to those of *Leptomeryx*, P^3 three rooted and probably with a median spur, P^2 double rooted, elongate entero-posteriorly and without median spur, I^1 to P^1 caniniform and slightly recurved, I^1 largest.

Hypermekops olseni spec. nov.

Type. M.C.Z. 3711 (Plate 8), a skull containing I^{1-2}, P^2 and ^{4}, and M^{1-3} of the right side, and 1^1 and P^4 to M^3 of the left side.

Horizon and Locality. L. Miocene, L. Arikareean; Thomas Farm, Gilchrist Co., Florida.

Diagnosis. Same as generic.

The skull was crushed flat when found but has been expertly restored for exhibition by Mr. Russell Olsen. Fully realizing the importance of this specimen, he performed this feat without disturbing the palate from the condition in which it was received at the museum. The bone of the anterior end of the snout was sufficiently dense and heavy so that the crushing did not shatter the bone but mashed it down in clean breaks which fitted together perfectly when the matrix was removed. Consequently there can be no doubt about the restoration of the end of the snout. There were good contacts for the pieces of bone of the dorsal side of the face all of the way back to the frontal crest. Both postorbital processes are complete so there can be no doubt about the position of the orbits. The occiput is moderately well preserved, and also the inferior and the antero-inferior borders of the orbits. Taking these into consideration there can be little doubt about the height of the frontal region of the skull.

The nasals are separated from each other and from the adjacent bones by suture. The exact nature of the fronto-nasal suture cannot be determined, but it appears to be W-shaped with the apices directed posteriorly. The frontals are separated from each other by suture.

The two halves of the palate are separated by suture, but no trace of the maxillo-premaxillary suture can be found.

The first incisor shows wear on the antero-medial and posterior sides. This indicates that it occluded with the first and second incisors of the lower jaw, which would enable the animal to get a firm grip on some fleshy part of a plant, such as roots and tubers, and rip it loose. The closed maxillo-premaxillary suture lends support to this hypothesis. Also the bones of the snout have the same dense, polished appearance that those in the snouts of pigs and peccaries have. However, the tip of the snout of this form seems to be too lightly constructed for any strenuous rooting.

The second incisor is smaller than the first and strongly recurved. It shows no wear except on the tip. The third incisor, the canine, and the first premolar are missing, but, judging by the sockets, they were about half the size of the first incisor.

Mr. Olsen took very careful measurements of the palatal side of the skull before beginning the restoration. The distances from the tip of the snout were taken at the tip of the tooth.

Condylo-basal length	381
Condyles to M^3	130
Anterior border of orbit to tip of snout	275
M^3 to tip of snout	251
M^1 " " " "	214
P^2 " " " "	185
P^1 " " " "	134
C " " " "	114
I^3 " " " "	99
I^2 " " " "	77
I^1 " " " "	31
To these may be added:	
Length P^2 to M^3	81

Floridatragulus dolichantherius White

Proc. New Eng. Zool. Club, **18**, p. 34, pl. 7, 1940.

A few isolated teeth are the only additional material referable to this species which has been found.

Since both *Hypermekops* and *Floridatragulus* have extenuated snouts, it seems reasonable to suppose the former to be the ancestor of the latter, which has the longer snout. However, until we find corresponding parts of both forms we cannot be sure.

The presence of all three upper incisors in *Hypermekops* indicates that it developed from some Upper Eocene hypertragulid which was able to find a satisfactory ecological niche here.

PROTOCERATIDAE

Syndyoceras australis White

Proc. New Eng. Zool. Club, **18**, p. 97, pl. 15, 1941.

Although two additional mandibles of this form have been found they do not greatly increase our knowledge of it. As with *Protoceras* this form seems to be quite variable, and in view of the kinship of the two genera the differences presented are probably sexual rather than specific.

If the premolar-molar index is any indication of the degree of advancement of a species, *australis* is slightly less advanced than *cooki*.

The indices of the two species are: *australis*, 28/58 — 49%; and *cooki*, 32/61 — 52%. As far as we know this genus is restricted to the Lower Miocene.

CERVIDAE

Machaeromeryx gilchristensis White

Proc. New Eng. Zool. Club, **18**, p. 97, pl. 14, fig. 5, 1941.

The first and second upper molars with a fragment of the maxillary, and a lower jaw with well worn teeth are the only additional specimens of this species which have been found. The longer premolar series would seem to indicate that this species was more advanced than *M. tragulus*. This genus appears to be restricted to the Lower Miocene.

Parablastomeryx floridanus White

Proc. New Eng. Zool. Club, **18**, p. 34, pl. 6, 1940.

Three additional lower jaws of this species have been found. Its size is about that of *P. gregorii*. For comparison I have copied the premolar-molar indices given by Frick (Bull. A.M.N.H., **69**, p. 227, 1937) for the species of this genus.

Parablastomeryx	*gregorii*	23/33	70%
"	*olcotti*	20/38	71%
"	*primus*	19.3/28	69%
"	*falkenbachi*	20/27.5	73%
"	*schultzi*	17.5/27	65%
"	*advena*	19/25.5	75%
"	*floridanus*	20/33	60%

An examination of the table shows that *P. floridanus* has relatively the shortest premolar series of any species of this genus. If, as is commonly accepted, this is any indication of the evolutionary status of an artiodactyl species, this is the least advanced form in the genus.

A larger species is indicated by two lower jaws with Dp_{1-3} and M_{1-3}, but cannot be properly diagnosed at this time.

Floridachoerus and the Camelidae are not sufficiently well known to be of help in correlating these deposits with those of the Great Plains. The members of the Hypertragulidae are peculiar to this deposit. *Machaeromeryx* and *Syndyoceras* are limited to the Lower Miocene,

and *Parablastomeryx floridanus* appears to be the least advanced member of that genus. On the whole the Artiodactyla agree with the Carnivora in the Lower Miocene age of this deposit.

PERISSODACTYLA

As yet no evidence of either tapirs or chalicotheres have been found in the deposit on the Thomas Farm.

RHINOCEROTIDAE

The material belonging to this group has been turned over to Dr. Horace E. Wood, 2nd for study.

EQUIDAE

Anchitherium clarencei Simpson

Fla. State Geol. Survey, Bull. **10**, p. 32, figs. 18–19, 1932.

Only a single left lower jaw (M.C.Z. 3810, Plate 9) referable to this species has been found. It bears Dp_{1-3} and M_{1-2}. This specimen does not allow us to add anything to Simpson's analysis of this form.

Miohippus sp.

A few isolated upper cheek teeth in which the metaloph is not connected to the ectoloph are referred to this genus. None show any indication of a crochet. The posterior cingulum and the metaselene are well developed.

Parahippus blackbergi (Hay)

Plate 10

Miohippus blackbergi Hay, Proc. Biol. Soc. Wash., **37**, p. 2, pl. 1, figs. 4–5, 1924.
Archaeohippus nanus Simpson, Fla. State Geol. Survey, Bull. **10**, figs. 14–15, 1932.

Mr. C. J. Hesse, of the Museum of the Texas Agricultural and Mechanical College, has kindly loaned me his manuscript of his analysis of the *Archaeohippus* material from Garvin Gully. In it he suggests that these two forms are the same. His analysis compares so well with the Florida specimens that I see no reason for retaining them as distinct species.

Sixteen specimens, represented by a nearly complete upper dentition

of at least one side, are referred to this species. Also there are three pairs of lower jaws and three single lower jaws. All of the tooth characters are extremely variable but no one character seems to be associated with any other sufficiently well to permit a separation. There is a 16% variation in size but like the other characters it cannot be associated with any other one variation. The major variations are set forth in the accompanying table (Text fig. 2).

Crochet. The crochet, when present, is usually strong, but is not necessarily present on all of the molars. Some of the specimens which I indicated as being without a crochet have a slight wave in the enamel of the metaloph which could be interpreted as an incipient crochet. On one isolated tooth (M^2?) there appears to be a slight secondary fold on the crochet.

"*Anticrochet*". I have chosen this name for a plication on the posterior wall of the metaloph which is usually opposite the crochet but its position is not fixed. Usually it is associated with the crochet but this is not invariably the case, for one may be present without the other.

Plications on the Metaloph. Those on the anterior wall seem to be more or less independent of the crochet, but are usually present on the posterior wall only when the anticrochet is absent. When present the plications usually number two or three but may be as few as one.

Cement. When present, the cement is only a thin film, usually restricted to the outside of the tooth and the deeper parts of the fossette. The third molar always has the most cement. In the others it appears to be restricted to the outer base of the tooth. However, this may be due to wear. No. 3831 appears to have cement on P^{2-3}. The presence or absence of cement does not appear to be correlated with any particular one of the variations.

Size. Most of the specimens are very nearly the same size. Nos. 3820 and 3829, which present the greatest difference in size, are almost identical in the other characters. No. 3829 is 16% smaller than No. 3820, but is only 5% smaller than the average, while No. 3820 is 10% larger than the average.

Third Molar. In most of the specimens the third upper molar bears the same size relationship to the second in this species that it does in *Parahippus leonensis*. However, in some, M^3 is notably smaller than M^2. Among the isolated teeth referred to *Miohippus* is a single M^3 which is much smaller than the molars. In view of this, in those specimens in which it occurs, the small M^3 of this species is probably a holdover from the ancestral stock rather than a matter of reduction.

No.	Length			Width		Crochet				Anticrochet				Cement			Protocone separate at tip	Postfossett Closed	Plications on Metaloph
						Molars		Premolars		Molars		Premolars							
	P^2-M^3	P^{2-4}	M^{1-3}	P^4	M'	con	sin	con	sin	con	sin	con	sin	M'^{-3}	M^{2-3} only	none			
3832	59	31	28	14	13		X		X		X		X	X				P^2M^3	
2	60	33	29	14	14		X		worn		X					X		M^{1-3}	
3820	66	36	30	15	14	M^{2-3}	M'		X	M^2			X			X	P^{2-4}		
3811	56	30	29	13	12.7	X		X		M^{2-3}			X		X		none	$P^{2-3}M^{1-3}$	
5			29		13.5	X		X		M^3			X		X		none	P^{3-4}	
6			31		14.5	M'^{+3}	M^2			M'^{+3}	M^2					X		M'^{+2}	
7						X		X								X	none		P^{2-4}
8		31		14			X		X				X					P^2M'	
9		35		15	14	Faint			X			P^4					none		
3827	61	32	30	14.5	14.5		X		X	M^2			X			X		P^2M'	P^3M'
3831						X			X	M^{2+3}			X		X			P^3M'	$P^{2+3}M'^{+5}$
3841	61	32.5	29	14	14	M'^{+3}	M^2	P^4		M^3			X	X			none	$P^{2+3}M'^{+2}$	P^4M^2
3840	63	35	30	13	13		X		Dp		X		Dp			X		none	
3843	59	32	28	13	13		X		X		X				X		none	M^{2+3}	
3815	63	33.5	30	14.5	14		X		X							X	P^{3-4}	M'^{-3}	M'^{-3}
3829	56	30	26	13	12.5	X		P^4		M'^{+2}	X					X	none	P^2M^3	

Fig. 2. Table of measurements and variations of *Parahippus blackbergi* (Hay).

In the lower jaw the posterior lobe of the third molar is very little relatively than in the next species of *Parahippus* found in this deposit. Four of the lower dentitions have cement on the molars.

Protocone. In most specimens there is only a constriction between the protocone and the protoconule, but in Nos. 3820, 3831, and 3815 the tip of the protocone is separate in a few of the teeth, usually the premolars. This is also the case in some of the isolated teeth. Hesse (manuscript) reports that he finds the same condition in the specimens from Garvin Gully.

Milk Teeth. One specimen (M.C.Z. 3840, Plate 10, figs. 2 and 3) still has the milk teeth. The protocone is large and deeply constricted from the protoconule. The metaloph is connected to the ectoloph but shows no plications. The hypoloph is well developed and projects into the postfossette. The hypostyle and posterior cingulum are well developed.

Plihypostyle. Ever since the name *plihypostyle* was first applied to a feature in the postfossette of horse teeth, there has been considerable confusion regarding the homologies of structures bearing that name. It appears to have been used, at one time or another, for any structure in this area which could not be identified as the hypostyle. Obviously the *plihypostyle* of *Parahippus* cf. *nebrascensis* (Stirton, Journ. Mamm., **22**, p. 434, fig. 3, 1941) is not the homologue of the element bearing

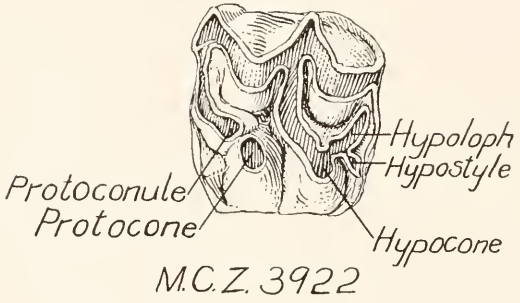

Fig. 3. Third upper premolar of *Parahippus blackbergi* (Hay) showing hypoloph. x 2.

that name in *Neohipparion* cf. *eurystyle* (ibid, p. 435, fig. 7). By extreme good fortune the fossil Equidae from the Thomas Farm demonstrate the development of the principal features in this area. Some of the specimens of *P. blackbergi* (Nos. 3820, 3815, and 3829), and a number of isolated teeth, show, on unworn or little worn premolars, a high thin

ridge (M.C.Z. 3922, Text fig. 3) extending from the hypocone to the posterior cingulum near the metastyle. By all of the rules of tooth terminology this ridge is the hypoloph and makes up the posterior half of the metaselene. In two of the specimens (Nos. 3815 and 3829) the metaselene is complete on one or more of the molars.

In its simplest form (P^2 of No. 3815) the hypostyle is a small conical tubercle on the posterior cingulum. However, in most cases it takes the form of a spur, projecting postero-medially from the inner end of the hypoloph. This condition is especially well demonstrated in the milk teeth of *Merychippus paniensis* and to a lesser degree in the milk teeth of *M. primus*.

The hypoloph, in the form it takes in the *premolars* of *P. blackbergi*, is present in the *molars* of *P. leonensis* and the less progressive specimens of *M. gunteri*, but this is not true of the premolars of *P. leonensis*. In the more progressive specimens of the latter species the postfossette wall of the hypoloph often bears a plication near the postero-lateral end. This appears to be homologous with the plihypostyle of *Neohipparion* cf. *Eurystyle* (ibid, p. 435, fig. 7) and for the sake of clearness and compatibility, I propose that this name be restricted, so that it will apply only to plications on the inner wall of the hypoloph. While this may not be in strict accordance with the customary practice in morphological names, it will make the terminology of the upper teeth more consistent with that of the lower.

This species presents many variations which are departures, in the direction of *Parahippus*, from a simple pattern similar to *Miohippus*. It is possible to find all of the generic characters of the teeth of *Parahippus* in this series of specimens. The greatest number of characters found in combination in one individual (No. 3831) is four, and many have three. These characters are:

1. Well developed crochet.
2. Plications on the anterior and posterior walls of the metaloph.
3. Protocone separate at tip.
4. Hypoloph and posterior cingulum closing the postfossette.
5. Cement on molars.
6. Height of unworn M^2 at paracone only slightly less than external length.

These characters, occurring in combinations of as many as four in one individual, indicates that this species stands genetically *very* close (and is probably ancestral) to some of the earlier species of this genus.

The simple and stable pattern of the cheek teeth presented by the Upper Miocene species of *Archaeohippus* and the more complex and

highly variable character of the teeth of this species presents us with two possibilities. Either the Florida stock retrogressed, or, the Plains were unsuited ecologically to this stock and they remained in the vicinity of the Gulf. Owing to the nature of the deposits in that area they are recorded only in Garvin Gully. In view of the Miocene geography of the Florida region (see that section), this stock can, at best, be only remotely related to that of the Plains, probably only in that they have *Miohippus* for a common ancestor. Consequently, to leave the Florida and Plains stocks in the same genus is a purely artificial classification, which defeats one of the primary purposes of taxonomy, in that it should be an expression of the genetics of groups of animals or plants. According to the available evidence this form is a *very* primitive species of *Parahippus*, bridging the gap between that genus and *Miohippus*. The weight of the characters lean more toward *Parahippus* than *Miohippus*, and it would not simplify matters any to name a new genus for this intermediate and highly variable form.

Parahippus barbouri spec. nov.

Type. M.C.Z. 3646, (Plate 11), a crushed skull which has been restored for exhibition, M^3 unworn.

Paratype. M.C.Z. 3814 (Plate 12) right lower jaw with P_2 to M_3.

Referred Material. M.C.Z. 3736, upper dentition lacking left M^3; and No. 3742, a well worn upper left dentition.

Horizon and Locality. L. Miocene, L. Arikareean; Thomas Farm, Gilchrist Co., Florida.

Diagnosis. A small *Parahippus* with a moderately heavy coat of cement on all cheek teeth, plications on anterior and posterior walls of metaloph, crochet simple and usually not in contact with protoconule, protocone joining protoconule on all teeth by the time M^3 has begun to receive wear, postprotoconal valley open except on M^1, postfossette may or may not be open on M^{1-2}, external styles well developed teeth subhy sidont.

Measurements

Number		3646	3736	3742
Length,	P^2–M^3	87	88	82
"	P^{2-4}	45	46	42.5
"	M^{1-3}	42	42	39.5
Width	P^4	17	17.5	17
"	M^1	17	18	16.5

The limited amount of material referable to this species, each showing a different stage of wear, does not give us any data on the amount of variation in the enamel pattern. The enamel pattern of this species is very close to that of *P. crenidens* (Scott) from the Deep River, U. Miocene of Montana and to *P. coloradensis* Gidley from the Pawnee Creek Beds of Northeast Colorado. So similar are their enamel patterns that it seems logical to suppose that the Florida stock persisted till near the close of the Miocene with only a slight increase in size.

Parahippus leonensis Sellards

Plate 13, figs. 1 and 2

Eighth Ann. Report of Fla. State Geol. Survey, p. 83, pl. 11, fig. 7, pl. 13, fig. 2–3, 1916.

Merychippus vellicans Hay, Proc. Biol. Soc. Wash., **37**, p. 7, pl. 1, figs. 18–19, 1924.

At first I referred this material to *Parahippus vellicans* (Hay), because most of the specimens were nearly identical with Hay's types. However the last three skulls which have been cleaned have convinced me that Sellard's type is an unusual varient of this population and consequently the species must be known as *P. leonensis*. Only one or two of the teeth bear the peculiar type of crochet found in the type of *P. leonensis*, nor is it always on M^1, but may be found on any tooth except P^2.

Mr. C. J. Hesse wrote, after examining a small series of teeth sent him; that in his opinion the Thomas Farm and Garvin Gully populations were conspecific.

Thirty-three specimens, represented by the upper cheek tooth series of at least one side, are referred to this species. A nearly equal number of lower jaws probably belong here. However, none of the lower jaws were found associated with the upper.

This species appears to embrace as wide a range of variation as *P. blackbergi*. Several of the specimens exhibit characters of size and enamel pattern suggestive of *P. barbouri*. It is hoped that further excavation will complete this gap in the record. The other extreme is with difficulty distinguishable from *M. gunteri*.

At first, I divided this series of specimens into three groups on the basis of the extremes of enamel patterns. For a period of about three weeks I reviewed them once or twice a day. Each time I shifted a few specimens from one group to another. Since it was impossible to make any division that would last over night, I concluded that only

one species was represented. The individuals of this species seem to represent three groups in the population; a conservative, a progressive, and an aberrant. The intergradation between these three groups seems to be complete.

Cement. The amount of cement varies from a very heavy coat (more than *M. primus*) to a very thin film. The usual amount seems to be a little less than *M. primus*. The third molar always has the most cement and the first has the least.

Crochet. The crochet is usually T-shaped with the crossbar of the T abutting against the protoconule. Sometimes it is only a V-shaped projection on the metaloph with the apex of the V directed toward the protoconule. Or, it may be a long narrow loop projecting between the protocone and the hypocone.

Metaloph. Unworn or slightly worn teeth bear plications on the anterior and posterior walls of the metaloph. Those on the posterior wall are smaller and fewer than those on the anterior, and soon disappear with wear. The plication nearest the metaconule is the strongest and may persist as long as those on the anterior wall.

The plications on the anterior wall are usually three or four in number, with those nearest the crochet the strongest. M^3 and P^2 usually have only one or two plications on the anterior wall.

Hypoloph. On the molars and sometimes on P^4 the hypoloph extends from the metaconule to the posterior cingulum near the metastyle. This is the same condition found in the premolars of *P. blackbergi*. In the premolars the hypoloph projects into the posterior part of the postfossette and does not reach the posterior cingulum. Its direction is more nearly lateral than postero-lateral as in the molars. A plihypostyle may or may not be present. It is more common on the molars than on the premolars.

Hypostyle. The unworn hypostyle is usually covered with cement, so that its shape cannot be determined. After a small amount of wear it is usually triangular in the molars and elliptical in the premolars, with the long axis parallel to the hypocone. It often appears as a spur directed postero-medially from the inner end of the hypoloph. In the more advanced specimens the hypostyle has gained the ascendency in growth over the hypoloph and receives wear first. It has the form of a long narrow loph paralleling the hypocone. The inner end usually projects into the postfossette. This projection cannot be considered a plihypostyle because of its origin as demonstrated by this material. Both features occur in some specimens. This condition is prophetic of that found in *M. gunteri* on all teeth except M^3.

Protocone. The protocone is usually joined to the protoconule by the time M^3 has begun to receive wear. It usually, but not always, displays a spur. There seems to be a positive correlation between the amount of cement and the length of time which the protocone is separate. In the two specimens with a very heavy coat of cement the protocones are separate even though M^3 has received considerable wear.

Milk Teeth. A number of specimens show the milk dentition in various stages of wear. No. 3759, with P^1 and M^1 just beginning to receive wear, displays the characters of these teeth the best.

The enamel pattern of the milk teeth is very similar to that of the permanent premolars. The crochet is well developed but usually does not abutt against the protoconule, more often it is broader at the base than at the outer end. The metaloph is connected to the ectoloph and has plications on both walls. Those on the posterior wall disappear first. Hypoloph and hypostyle are like those of the permanent premolars. Cement absent except for a thin film on the exterior base of two specimens.

The milk teeth of this species are very similar to a cast of the type of *Parahippus cognatus* Leidy and the permanent teeth are very close to the type of *P. brevidens* (Marsh). Certainly these three species are very close genetically and possibly should bear the same name, in which case, they should be known as *P. cognatus* Leidy, since that is the earliest available name. The scarcity of the remains of *cognatus* and *brevidens* would lead one to believe that this stock was well past its prime in the Upper Miocene. It does not seem unreasonable that a stock which received its inception in the Lower Miocene should persist with diminishing abundance till near the close of the Miocene.

Merychippus gunteri Simpson

Plate 13, fig. 3

Bull. Amer. Mus. Nat. Hist., **59**, p. 165, fig. 10, 1930.

This species unquestionably arose from *Parahippus leonensis* Sellards. The transition between the two species is well represented by complete dentitions. Fortunately it is still possible to set up an arbitrary rule which will distinguish the conservative members of this species from the progressive members of the preceding one. This rule is:—The crochet must have joined the protoconule on M^{1-2} by the time wear has exposed the principal cusps on M^3 before the speci-

men can be placed in *M. gunteri*. At this time both species have a height of tooth at the mesostyle on M^2 of 10 mm. When the teeth of the progressive specimens of *P. leonensis* are worn so that M^2 has a height of 7.5 mm at the mesostyle they display most of the characters of *M. gunteri*. None of the unworn teeth of either species have a height of crown to exceed 15 mm at the paracone.

Unfortunately the material representing this species is not plentiful; a badly broken skull with good teeth, a complete upper dentition of both sides, three specimens with five cheek teeth in series, and three with three or four teeth.

Cement. All specimens have a uniformly heavy coat of cement on the outside of the tooth, about the same as the most advanced specimens of *P. leonensis*. M^1 always has the least amount of cement in the fossettes and M^2 is next. In M^3 and the premolars the fossettes are usually nearly filled. The postprotoconal valley has less cement than the fossettes.

Crochet. On the molars the crochet has joined the protoconule before the tooth has received much wear, often on M^{1-2} before M^3 has erupted. A greater amount of wear is necessary in the premolars for these two structures to join, and apparently they never join in P^2. Usually there is only a single plicabellin and pliprotoconule but one specimen displays two of each on M^1.

Hypoloph. The hypoloph and hypostyle are very little different from those in the premolars of *P. leonensis* except on M^3 in which, on most specimens, it exhibits its earlier characteristics. A plihypostyle is often present on the premolars but is not so common on the molars.

Metaloph. The plications on the metaloph do not differ materially in size and distribution from those on *P. leonensis*, except that they seem to persist longer in those species. One rather unusual specimen shows five plications on the anterior wall and four on the posterior wall of M^1.

Protocone. The protocone always has a spur except in the early stages of wear on P^2. It usually joins the protoconule on all teeth by the time M^3 has begun to receive wear.

Milk Teeth. An isolated Dp^2 seems referable to this species. The tooth has received considerable wear but not enough to obliterate the details. No trace of cement can be found. The crochet has joined the protoconule and there is a suggestion of a plicabellin and a pliprotoconule. There is one large and one small plication on the anterior wall of the metaloph. The posterior wall is smooth. The hypoloph is

well developed and separated from the hypocone by a thin line of enamel. The hypostyle is small and triangular in outline with the apex directed toward the inner end of the hypoloph. The protocone bears a spur and is separated from the protoconule by a thin line of enamel.

It would be comparatively easy to derive the enamel pattern of most of the species of *Merychippus* from that of this stock. The simplest pattern exhibited is only slightly more complex than that of *M. primus* and the most complex is about equal to that of *M. sphenodus* (Cope) and *M. ealamarius* (Cope). The pattern of most of the specimens is about the same as that of *M. secundus* Osborn (if that is a valid species). However, if, as Stirton (1940, Univ. Calif. Bull. Dept. Geol. Sci., **25**, p. 181, Footnote 12) suggests, *M. secundus*, *tertius*, and *quintus* are synonyms of *M. primus*, the size and height of crown become the principal differences between *gunteri* and *primus*. This difference is sufficiently great to justify retaining them as distinct species. Simpson (1932 D, p. 27, Footnote 5) suggests that *M. gunteri* and *primus* arose from different species of *Parahippus*. In the light of this material I believe it more likely that the latter is the descendant of the former.

Merychippus westoni Simpson

Bull. Amer. Mus. Nat. Hist., **69**, p. 164, fig. 9, 1930.

In the material from the Thomas Farm I have not been able to identify with certainty this species. In the isolation of the protocone it seems to be more advanced than *gunteri* and probably represents a later stage in evolution.

These horses are less advanced than those of the Middle and Upper Miocene, although their closest relatives are found in deposits of those ages. They appear to have very little in common with the Lower Miocene horses of the Great Plains. On the whole they are of very little help in correlating the age of this deposit.

Development of Tooth Form in Horses as Indicated by this Material

Although this series is far from complete, there are a sufficient number of stages so that a moderately clear picture can be obtained.

Separation of Protocone. In *P. blackbergi* the protocone appears to be separated from the protoconule first on P^{3-4}. The protocone is usually deeply constricted from the protoconule on P^2 and M^1 but the tips are seldom separate. It may be separate on M^1 and not on P^2.

Unfortunately there are no specimens showing the protocone becoming separated on M^{2-3}. In the other species of *Parahippus* and in *Merychippus* the tip of the protocone is separate in the early stages of wear.

Cement. The cement first appears on M^1 or ^{2} in *P. blackbergi.* In the cases in which it is present only on M^{2-3} I cannot be certain that it never had been on M^1. It is thought to be present on the premolars of No. 3820 but it is difficult to be certain. In the other species of *Parahippus* and in *Merychippus* M^1 always has the least cement and M^3 has the most. Among the premolars P^2 has the least and P^4 the most but none as much as M^3. There seems to be a positive correlation between the amount of cement and the order of tooth succession.

Hypoloph and Hypostyle. The development of these two features were fully treated in the consideration of *P. blackbergi.*

Crochet and Plications on the Metaloph. The form of these features are fairly well catalogued under the various species. There is, however, a plausible explanation of their mode of formation based on the embryological principal of *Unequal Growth.*

Both embryology and the observations of unerupted teeth show that the durable layers of the teeth are deposited from the crown to the base. The general form of the tooth is determined by the mesodermal papillae which outline in a general way the principal cusps and lophs, which grow down (or up in the lower jaw) to meet the dental germ and is enveloped by it. As the dental germ (enamel depositing cells) spreads over the sides of the lophs into the fossettes the cells must divide rather rapidly to supply the necessary amount of envelope. If the cell division is more rapid than necessary, or if it continues after the loph is covered, it creates more surface than there is space to accommodate it. This internal pressure, pushing against the already established cusps, which act as buttresses, causes the surface to buckle and be thrown into folds. The crochet, after the metaloph has joined the ectoloph, occurs in the logical place for the surface to buckle from the internal pressure set up by the rapidly multiplying cells of the dental germ layer; i.e.; at the apex of the curve of the metaloph. The location of the "anticrochet" is determined in the same way. That the secondary folds are formed subsequent to the formation of the principal features is indicated by the fact that they always occur in the areas of thin enamel. There are a number of unerupted teeth in the material from Florida in which the deposition of enamel is complete and which contain no dentine on the inside of the tooth. This indicates that the details of tooth form are determined by the proliferation of the enamel depositing cells.

Union of Crochet and Protoconule. The embryology of the tooth permits us to postulate the steps through which the crochet becomes united to the protoconule.

In some specimens of *P. blackbergi* the crochet abuts against the protoconule. This is true of nearly all of the specimens of the other species of *Parahippus* found in Florida. The protoconule must have been well established by the time the crochet began to form. This resulted in the latter flattening its end against the protoconule. To create additional space for the over abundant enamel depositing cells the crochet became constricted at the base by the process mentioned above. By this time the crochet is T-shaped. The crossbar of the T in the crochet of *Parahippus* becomes the plicabellin and the pliprotoconule of *Merychippus*. Eventually the crochet came abreast of the protoconule in its order of development and these two areas of growing tissue met, fused, and split in the same manner as the foetal membranes. I have been unable to find a statement of this principle in any of the textbooks of embryology at hand but I think the following will express the idea sufficiently well; When two outpouchings of growing tissue from the same germ layer meet, first there is a fusion of the two surfaces, then a fission in a plane parallel to the axis of juncture but at right angles to the plane of fusion. It seems highly probable that this same process was involved in the union of the metaloph and ectoloph, and also in the isolation of the protocone in *Hipparion* (sensu latu).

SUMMARY

Eighteen genera and twenty-two species of mammals have been identified from the Thomas Farm in Gilchrist County, North Florida. In order to determine the age of this deposit the closest relatives of these species were sought in the deposits of the Great Plains. The Artiodactyla present a decided Lower Miocene aspect. Two of the genera are restricted to deposits of that age on the Plains. Two genera of one family (Hypertragulidae) seem to be peculiar to the deposit in North Florida. Among the Carnivora are two genera which did not persist on the Plains beyond the Upper John Day – Lower Rosebud age. There is one species in each of two other genera which are *very* closely related to plains species in the same genera of the Late Middle and Upper Miocene. The Equidae are all progressive and their only relatives are found in the Late Middle and Upper Miocene deposits of the Plains. Since the vertebrates give such a paradoxical correlation, other sources were examined for data to aid in determining the

age of this deposit. Overlying the deposit in which the mammalian fossils occur is an erosional remnant of what is believed to be a member of the marine Hawthorne formation. However, no identifiable invertebrates have been found in it. Invertebrate fossils, as well as cobblerock, from the Ocala and Suwannee limestones are found mixed with the vertebrate fossils. It would seem then that the mammalian remains were buried during the interval between the deposition of the Suwannee limestone and the deposition of the upper part of the Hawthorne formation.

An examination of the geologic map of Florida shows that this locality was near the northern end of an island during the Lower Miocene. This gives a plausible explanation of the anomalies in the correlation of the vertebrate fauna. The forms in this fauna closely related to the Upper Miocene forms of the Plains developed on the island and were unable to escape to the mainland till after the Early Middle Miocene.

2. GEOLOGY

LOCAL DETAILS

Plate 14

The Raeford Thomas Farm is located 8 miles north of Bell in northern Gilchrist Co., Florida. It is near the eastern edge of the watershed which separates a series of small lakes on the east (which drain by an unnamed creek into the Santa Fe River) from the Suwannee River on the west. On this watershed frozen (or fossil) sand dunes are the principal topographic features, with sinkholes running a close second. The top soil, in some places to a depth of many feet, is yellowish sand which may be the result of the weathering of the Hawthorne formation.

The pit from which the fossils are being taken is on the eastern edge of a circular depression about 250 feet in diameter and about 20 feet deep. The form of the depression with its gently sloping sides and shallow depth is closer to that of a "blow out" between sand dunes than it is to a sink hole. A test hole, dug with a six inch auger, encountered a rocky stratum at eight feet. The data obtained was not sufficient to determine whether this stratum was the Ocala limestone or a boulder bar similar to the one encountered in the pit. Although the evidence concerning the origin of this depression is not conclusive, there is no reason to suppose that it played any part in the deposition of the sediments which carry the mammalian remains.

For additional information concerning the area around the pit I am greatly indebted to the Florida State Geological Survey for contributing the time of Mr. Clarence Simpson, who spent two days boring testholes around the excavation. He took numerous samples from the test holes which were analyzed in the laboratory of the Survey.

The main part of the pit is about 100 feet long and about 60 feet wide (Plate 14, fig. 1). The pit is about 14 feet deep in the deepest part. To facilitate the removal of the refuse earth a narrow trench, wide enough to permit a mule with a scrape to pass, was dug from the pit to the deepest part of the depression mentioned above.

The surface of the area from which the fossils are taken is covered by loose, yellowish sand which varies in depth from a few inches to a few feet. The color and texture of this sand suggests that it may be the result of the disintegration of the calcareous sandstone members of the Hawthorne formation. Below the loose sand is a layer of joint

clay which varies in thickness from one to about four feet. In the area west of the boulder bar (Plate 14, fig. 4) the clay grades into the lime sand below it. It was here that the Florida State Geological Survey dug its pit and the Museum of Comparative Zoölogy started its excavation. A few species were found in this part of the excavation which have not been found in the deeper part. These forms are; *Anchitherium clarencei*, *Merychippus gunteri*, and *Mephititaxus anceipidens*. The only identifiable specimens of *Oxydactylus floridanus*, *Paratylopus grandis*, and *Floridatragulus dolichantherius* were found here. However loose teeth and other fragments were found deeper in the pit. The joint clay contains much broken bone and loose teeth. A few horse skulls were found in this layer but were very badly broken although not badly crushed.

At the eastern end of the pit, between the surface sand and the joint clay, is about three feet of cream colored, pumice-like sandstone with brown spots. Lithologically it resembles the upper members of the Hawthorne formation exposed in the Devil's Mill Hopper near Gainesville and that in a road cut between the Seaboard Railway Station at Gainesville and Bivin's Arm. Sandstone similar to that found at the pit, is exposed in road cuts along the highway north of Bell. The test holes, bored by Mr. Clarence Simpson, indicate that this sandstone once covered the area now being excavated. If the correlation of this sandstone is correct, this cycle of fluvial deposition was brought to a close by the invasion of the Hawthorne sea.

Below the Joint clay is a layer of clayballs, which as near as could be determined, are eight to twelve inches in diameter. In some places they are piled four or five deep. In reality they are a mass of bone fragments and teeth held together by clay. Occasionally a nearly complete leg bone or jaw is found, but is usually very badly broken. There is a strong possibility that the bone fragments and isolated teeth are reworked material.

At the west end of the pit, lying partly below the clay balls and partly below the joint clay, is a lens of lime sand whose greatest thickness is about three feet. The lime sand grades in the joint clay where the two are not separated by the clayballs. Also there is a lens of lime sand below the thin southwestern edge of the boulder bar (Plate 14, fig. 3). Most of the lime sand is moderately coarse but some of it is fine enough to be classed as silt. Most of the bones found in the lime sand are whole, but often they are so soft that it is impossible to save them. Most of the specimens obtained by the Florida State Geological Survey came from the lime sand above the boulder

bar. *Merychippus gunteri* and advanced specimens of *Parahippus leonensis* occur here.

Lying immediately below the beds mentioned above and extending diagonally across the excavation (Plate 14, fig. 1) is a bed of boulders which vary in size from two or three inches in diameter to as much as fifteen in the largest ones. However, the majority have a diameter of six or seven inches. The interstices between the boulders are filled with gravel and lime sand. All of this material appears to have been derived from the Suwannee and Ocala limestones. The material is entirely unsorted. The bed is thickest at the middle and thins out at the edges. This bed contains many horse skulls which are hopelessly crushed. Some are moulded around boulders so that it is impossible to save them. Many invertebrates characteristic of the Suwannee and Ocala limestones are found in the boulder bar.

Below the boulder bar the excavation has penetrated about six or seven feet into a bed of laminated bluish clay. Many of the laminae are separated by a thin layer of clean, white quartz sand, while others are separated by a thin layer of silt. There are local pebble layers which may be two or three inches thick. The bedding is very lenticular with most of the lenses only a few feet across. The preservation of the bone is the best in this part of the excavation. Although the skulls are crushed the bone is quite firm so that restoration is possible.

The lack of sorting of the material which makes up the boulder bar, and the lenticular nature of the laminated clays below it, indicate that these sediments are not of marine or lacustrine, but of fluvial origin. The general outlines of the history of this stream are fairly obvious. The initial stage was a period of erosion during which the stream scoured out its channel in the soft Ocala and Suwannee limestones. Next the force of the stream was lessened so that it began to silt up its channel, burying the remains of the animals which perished along its course. Later the stream was rejuvenated and its carrying capacity increased to the extent that it was able to transport the large boulders which make up the boulder bar. Still later the transporting power was again reduced so that it was able to carry only fine sand and silt. Eventually the lower reaches of the stream were drowned by the advance of the Hawthorne sea.

The data for limiting the period of time represented by this deposit are the presence of Ocala and Suwannee invertebrates in the deposit and the Hawthorne formation lying above it. Thus this period of time began after the deposition of the Suwannee limestone (Upper-

most Oligocene) and came to a close before the end of Hawthorne time (Late Lower Miocene).

Unfortunately there are no data concerning the duration of the period of channel cutting. The Ocala and Suwannee limestones are poorly consolidated and would erode very easily. If the structure of the Central Florida Dome at this time was at all similar to what it is today the gradient would be about four feet per mile. This would be sufficient gradient to cut a considerable channel in a relatively short time.

The events which caused this stream to silt up its channel are not at all evident. Although Mansfield (1937, p. 42) presents evidence that the Tampa was a transgressing sea and that the upper zones overlap the lower, I believe this part of the stream was too far from the shoreline to have been affected. In view of the purity of the Ocala and Suwannee limestones this stream must have drained a very large area to have accumulated the amount of clay found in this deposit.

Mansfield (1937, p. 44) insists that there was a period of uplift at the close of Tampa time. As near as can be determined from the distribution of the Tampa and Hawthorne sediments, the western edge of the Florida Plateau was elevated at this time. It seems logical that this would increase the size of the drainage basin and lengthen the stream. The increased drainage basin would increase the head of water and the transporting power so that it would be able to pile up the boulders found in the boulder bed. As the Hawthorne sea advanced the stream again lost its power to transport boulders and cobble rock, and deposited sand and clay in its channel. Eventually this portion of the stream was drowned by the Hawthorne sea.

PALEOGEOGRAPHY

An examination of the geologic map of Florida shows that the area in which the mammalian fossils are found was undoubtedly an island during Lower Miocene time. In order to get a better concept of the sequence of events it seemed desirable to compile maps of the Early Tertiary formations of the southeastern United States. In these maps the solid lines represent the known limits of the outcrops and are *not* intended to represent old shore-lines. The dashed lines indicate the probable limits of the formation in areas in which it is buried under younger formations. Although I have covered most of Florida by auto during the past three winters, I have taken the data for these

maps from the more recent literature. For convenience I have included a correlation chart of the Oligocene and Miocene taken from Cooke (1935), except the Alabama Miocene which is from Semmes (1929) after Cooke.

		S. CAROLINA	GEORGIA	FLORIDA		ALABAMA	
				Eastern	Western	Eastern	Western
MIOCENE	Middle				Alum Bluff Group: Shoal River, Oak Grove Sand	Hattiesburg Clay	
MIOCENE	Lower	Hawthorne	Hawthorne	Hawthorne	Alum Bluff Group: Chipola Marl	Catahoula sandstone	
			Tampa ls.	Tampa ls.	Tampa ls.		
OLIGOCENE		Flint River	Flint River	Suwannee limestone	Flint River	Flint River	Chichasawhay Marl
OLIGOCENE				Absent?	Represented	Absent?	Bucatunna Clay
OLIGOCENE		Absent	Absent	Glendon limestone		Absent	Glendon limestone
OLIGOCENE		Absent?	Absent?	Absent	Marianna ls.	Marianna limestone	Red Bluff lay
UPPER EOCENE		Cooper Marl; Santee ls.	Barnwell; Ocala ls. / Tivola tongue of Ocala ls.	Ocala LS.	Ocala LS.	Ocala limestone / Jackson formation	Yazoo Clay; Cocoa Sand
		Barnwell					

The time interval to be considered here is that between the deposition of the Ocala limestone of Upper Eocene age and the withdrawal of the Hawthorne sea. During this time Florida alternated between an island and a peninsular condition several times. This unstableness appears to have been due as much to minor crustal movements as to major variations in sea level. No attempt has been made to correlate the crustal movements of this area with those of the Caribbean.

All available data indicate that Florida was a submerged plateau throughout the Eocene. The close of the Eocene was marked by the beginning of a series of crustal movements which resulted in the formation of the *Central Florida Dome*. The distribution of the Oligocene and Miocene sediments indicate that the dome is the result of two sets of pressures working at nearly right angles to each other and at different times. That initiated at the close of the Eocene was a northwest-southeast pressure which affected the whole of the plateau and forced all but the southern portion out of water. At the same time there was a compensatory downwarping of the strata across the northern end of the plateau to form the *Okefenokee Trough*. At different times the sea invaded this trough and cut Florida off from the mainland.

During the Lower Oligocene, while the Marianna limestone was being deposited, the sea invaded the Okefenokee Trough only far enough to form a large bay at either end (Text fig. 5). The evidence for the bay in southeastern Georgia is the unusual thickness of the Oligocene sediments reported by Prettyman and Cave (1923) as being encountered in deep wells. However these sediments were identified mainly on lithological grounds.

There was a renewal of the crustal movements at the close of Marianna time, which resulted in the formation of the *Hatchatigbee Arch* in western Alabama and in deepening of the Okefenokee Trough so that the Gulf communicated with the Atlantic across North Florida and South Georgia (Text fig. 6) through a strait, probably not over 50 or 60 miles wide. At this time the Glendon limestone was deposited. This period of deposition appears to have been brought to a close by a period of general emergence without any noticeable deformation of the land mass, and Florida was again connected with the mainland.

The late Upper Oligocene was a period of general submergence which reduced Florida to a relatively small island in what is now the northwestern part of the peninsula (Text fig. 7). The strait which separated Florida from the mainland must have been nearly 150

miles wide. During this time the Flint River and Suwannee limestones were laid down. This period of deposition was brought to a close by a renewal of the crustal movements which marked the opening of the

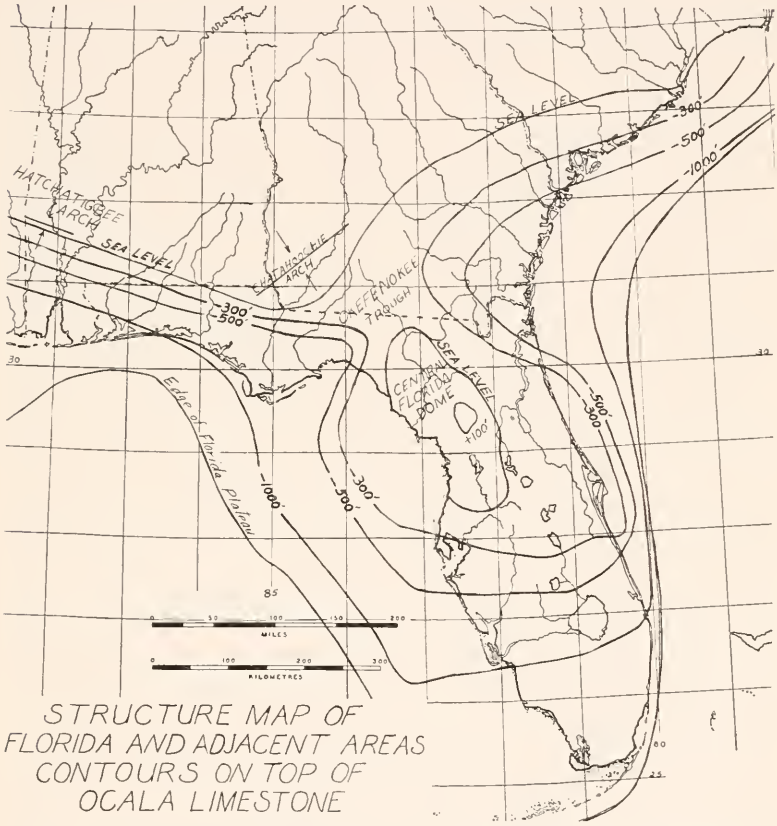

Fig. 4. Structure map of Florida and adjacent areas from Mossom (1926), Cooke and Mossom (1928), and Prettyman and Cave (1923).

Oligocene. At this time the *Chattahoochie Arch* in southwestern Georgia and southeastern Alabama was formed. The distribution of the Flint River sediments indicate that the main axis of the arch has a northeast-southwest direction rather than a north-south one as

postulated by Stephenson and Veatch (1915, p. 58). The formation of the arch seriously restricted the width of the trough in this area. During this same time interval the Florida Plateau was subjected to east-west pressure which shifted the long axis of the dome from an east-west direction to a north-south one. Stephenson and Veatch (1915, p. 59) applied the name *Withlacoochie Anticline* to the northern part of the Central Florida Dome. I have used the latter term because it seemed to convey a cleared concept of the doming of the Ocala limestone.

Although the contact between the Suwannee and Tampa limestones has not been observed, the very different distributional patterns of the outcrops of the two limestones permit us to postulate an interval of uplift and a land connection between the island and the mainland during the interval between their depositions. Prettyman and Cave (1923, p. 82) report that the Chattahoochie (=Tampa) limestone is conglomeratic in the southwestern part of Georgia and that it lies unconformably above the Glendon (=Flint River) limestone.

The very thin layer of limestone in the Ocala area containing Late Tampa Fossils (Mansfield, 1937, p. 24) indicate that there was continuous subsidence of the island till the end of Tampa time. The thickness of the Tampa limestone reported in the deep wells which have been studied substantiate this. The thicknesses are: Monroe Co.—300 ft. (Cole, 1941, p. 10); Polk Co. 140 ft. (ibid, p. 5); Gulf Co. 84 ft. (Cole, 1938, p. 9). Mansfield (1937, p. 31) reported a thickness of 89 ft. for the Tampa limestone in Gadsen Co. (Type locality of the Chattahoochie formation). Small discrepancies are inevitable in well records unless a continuous log is kept, but the differences shown here are much too great to attribute to normal error. Consequently it seems reasonable to assume that the younger zones of the Tampa limestone overlap the older.

Concerning the interval between the Tampa and Hawthorne, Mansfield (1937, p. 44) says: "The lithological and the faunal difference between the Tampa limestone and the succeeding Alum Bluff group seem too great to attribute solely to shifting of shore-line currents and therefore strongly suggest a period of uplift at the end of Tampa time, followed by subsidence and deposition of the Alum Bluff group." Cushman and Ponton (1932, p. 31) say: "However, in the case of the Chipola formation along the Chipola River, at and near its type locality, we find the soft, greenish-gray shell marl of the Chipola lying on what looks like the eroded surface of the hard, white to buff limestone of the Tampa." This area appears to be rather close to the north

boundary of the Okefenokee Trough and could be only a local unconformity. However at Rock Bluff in Liberty Co. the section is very different. Cooke and Mossom (1928, p. 119) say: "It is difficult to

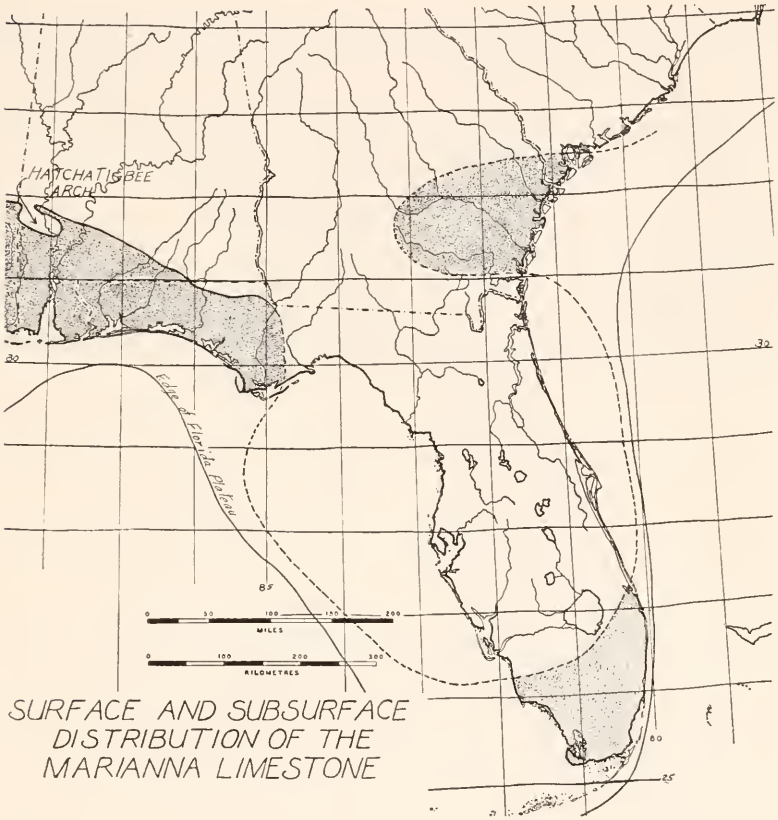

Fig. 5. Distribution of Marianna limestone (stippled portion).

draw the line precisely between the Tampa limestone and the Hawthorne formation at Rock Bluff, for one seems to grade perfectly into the other." Rock Bluff is about 20 miles north of what is believed to have been the middle of the Okefenokee Trough. Consequently there is no good evidence that the trough was drained at this time.

The distribution of the outcrops of the Tampa limestone and Hawthorne formation show that the western side of the Florida Plateau was elevated at the close of Tampa time so that the bulk of the land

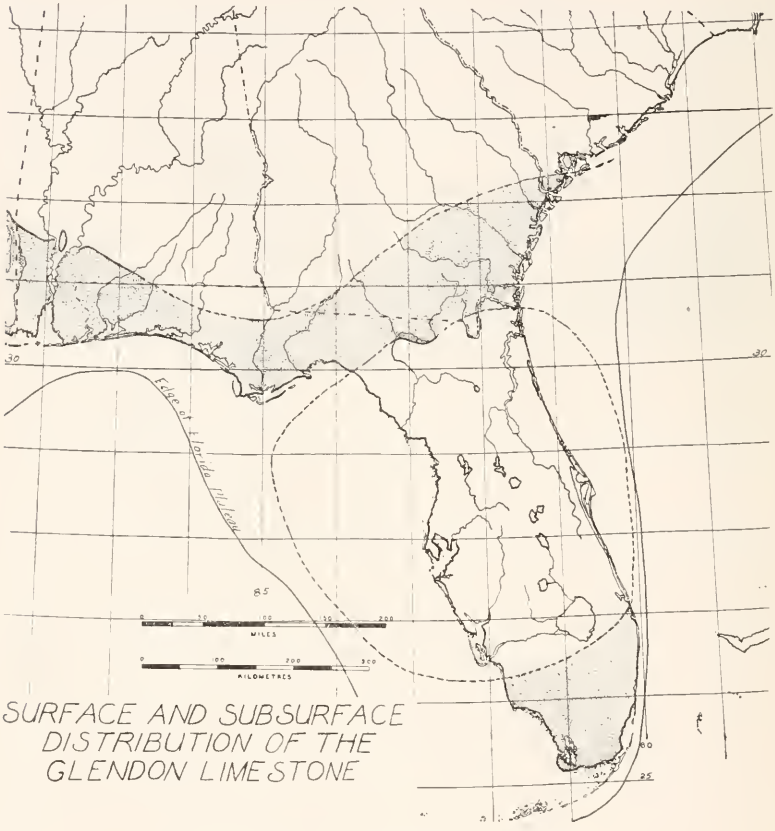

Fig. 6. Distribution of Glendon limestone.

lay west of the axis of the plateau. In the excavations in Gilchrist Co., a boulder bar (some of the boulders were fifteen inches in diameter) was encountered in the old stream channel in which the fossils are found. It seems logical that this bar should have been formed at this interval of uplift. The elevation of the west coast alone would have

given the stream sufficient gradient to transport the boulders. There is no evidence in the fossil mammals for postulating a land bridge between the island and the continent at this time.

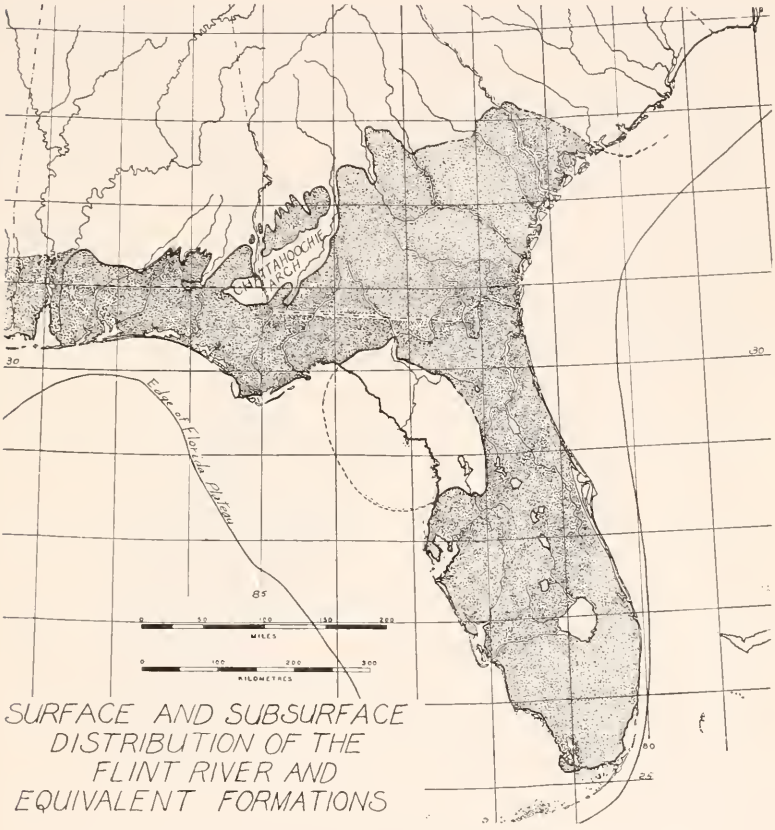

Fig. 7. Distribution of Flint River and equivalent formations.

Because of the very poor state of preservation of the fossils found in the Hawthorne formation, there is considerable doubt concerning the amount of time that it represents. Cooke and Mossom (1928, p. 98) say: "In the Peninsula the Alum Bluff group is represented by the Hawthorne formation. Fossils obtained from the Hawthorne show

that at least part of it is of Chipola age, but its fauna at some localities seems to be younger than the Chipola." On page 110 of the same publication they report that the Oak Grove fauna is found on hilltops near

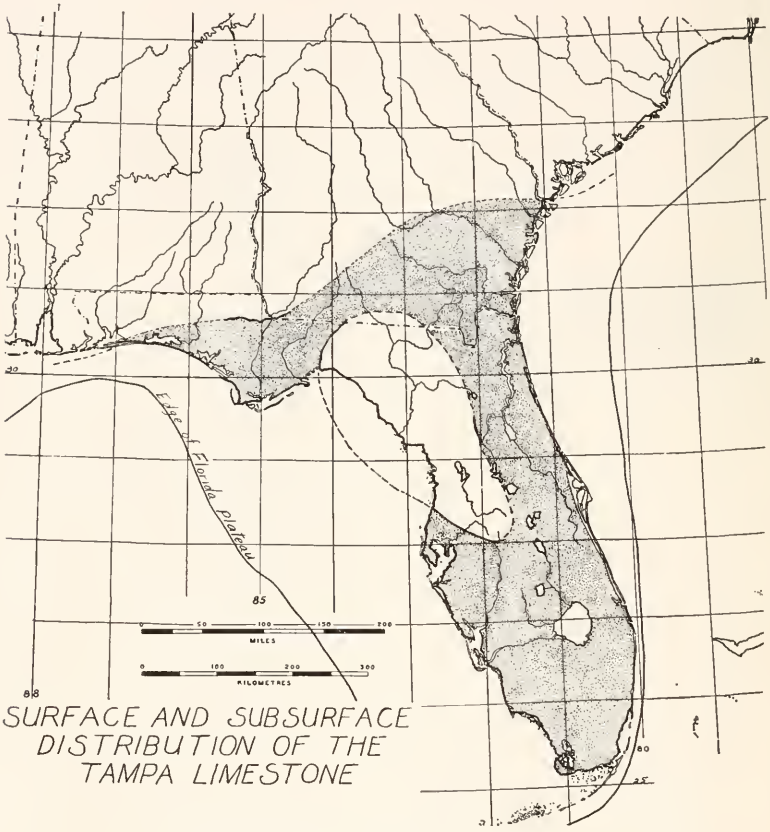

Fig. 8. Distribution of Tampa limestone.

Bainbridge, Georgia and Roberts, Escambia Co., Alabama. Cooke (1935, p. 100) assigns the Alum Bluff of Georgia to the Hawthorne formation. It would appear then that the Hawthorne included beds equivalent in age to the Oak Grove Sand, but, as far as I have been able to learn, the Shoal River fauna has not been recognized in the Hawthorne formation.

At Alum Bluff, 4½ miles north of Blountstown, Liberty Co., Florida Cooke and Mossom (1928, p. 108) record an unconformity between the Chipola formation and the overlying, plant-bearing beds whose age is

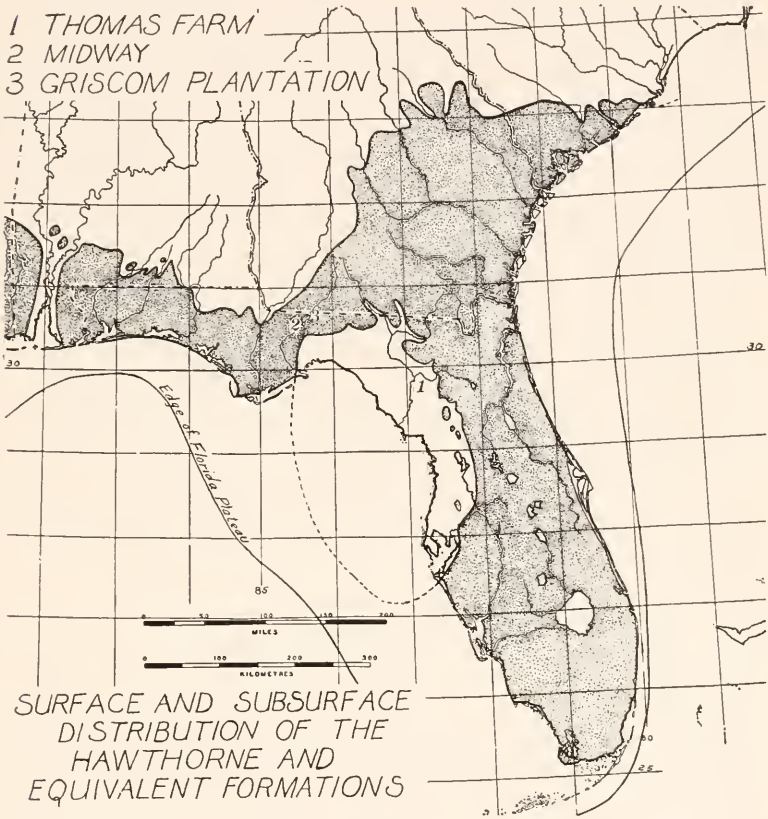

Fig. 9. Distribution of Hawthorne and equivalent formations.

still in doubt. This locality is so close to the north boundary of the Okefenokee Trough that the unconformity could be caused by a fluctuation of the shore line that would not necessarily drain the trough. As far as I have been able to learn this is the only unconformity recorded in the Hawthorne formation.

Cushman and Ponton (1932) seem to be of the opinion that there was no wide spread interruption in deposition during Alum Bluff time. They (1932, p. 32) say: "The shore-line during this period was a very variable feature, advancing and retreating, depositing beds of varying thickness but all comparatively thin, and forming over-laps to such an extent that it is possible that such over-laps might be mistaken for an unconformity, even between successive zones at any one exposure."

If the unconformity above the Chipola formation at Alum Bluff is only a local feature, the mammalian fauna of the island would have no opportunity to communicate with that of the mainland till after the close of Oak Grove time. This agrees very well with the present correlation of the continental Miocene of the Great Plains. *Tomarctus thomasi*, *Amphicyon longiramus*, *Parahippus barbouri*, *P. leonensis*, and *Merychippus gunteri* of the Lower Miocene fauna of Florida are very closely related to *Tomarctus optatus* and *brevirostris*, *Amphicyon sinapius*, *Parahippus coloradensis* and *brevidens*, *P. cognatus* and *brevidens*, and *Merychippus primus* respectively, of the Late Middle and Upper Miocene of the Plains. That the latter group have no close relatives in the Lower Miocene fauna of the Plains lends support to the idea that they descended from the Florida stock, but were unable to reach the Plains till after Oak Grove time.

It seems probable that the mammalian fossils found at Quincy, Midway, and Griscom Plantation (since they occur in marine sediments) had been washed out to sea after severe storms either as carcasses or as individual bones.

ENVIRONMENT

During the time period represented by the fluvial deposit in Gilchrist Co., Florida was a limestone island cut off from the mainland by a shallow sea fifty or sixty miles wide. In Tampa time Florida was an elliptical island roughly 220 miles north-south by 100 east-west. The crustal movements at the end of Tampa time shifted the shore line some but only slightly increased the width. The strait which separated the island from the continent was not appreciably wider during Hawthorne time than during the Tampa.

If the structure of Florida (Text fig. 4) during the Lower Miocene was at all similar to that of today the highest part of the island would have had an elevation of about 200 feet. This is not enough seriously to affect the climate. There is no reason to suppose that the climate was very different then than now.

The bedrock of the central part of the island was formed by the Ocala limestone and the Suwannee limestone formed that around the edges. Both of these limestones are granular and poorly consolidated. Also both are very pure, but of the two the Suwannee limestone carries a slightly higher content of impurities. Concerning the Ocala limestone Cooke and Mossom (1928, p. 48) say: "Its texture is commonly granular, but parts of it have been converted to hard, compact rock by the deposition of travertine or calcite in its interspaces. In some places it consists of a loosely coherent mass of Foraminifera, Bryozoa, and other small organisms, a mass so porous that water can percolate freely through it; elsewhere it is finer grained and more compact, although still pervious to water.

"In chemical composition, as in physical character, the Ocala limestone is remarkably uniform. It consists almost entirely of carbonate of lime, and in places contains as little as four-tenths of one percent of impurities."

The same statements are essentially true of the Suwannee limestone. Of it Mansfield (1937, p. 46) says: "The formation consists almost entirely of limestone. The unweathered rock is granular to dense, compact, usually cream-colored, rather pure limestone. The lower part is at many places more granular than the upper. Mossom gives the following analysis of Suwannee limestone for the quarry of the Florida Hard Rock Products Co., Brooksville, Fla.:

"Silica (SiO_2)	6.54
Iron and alumina (Fe+Al)	1.44
Calcium carbonate ($CaCO_3$)	91.09
Magnesium carbonate ($MgCO_3$)	trace
Undetermined	.93
	100.00"

There is, in the Tampa area, a bed of "tough, plastic, greenish sandy clay" 41 to 64 feet thick (Mansfield, 1937, p. 14) below the Tampa limestone. This bed has been encountered in wells and is not known as an outcrop. A somewhat similar deposit is recorded (Mansfield, ibid, p. 29) below the Tampa limestone at Wyley Landing, Georgia. Similar deposits of this age are as yet unknown elsewhere in Florida. It is possible that both are delta deposits and very local in extent.

From the above it is evident that the soil of this island, during the Lower Miocene, was a soft, porous, very pure limestone into which the plants could force their roots without much difficulty. Also these

limestones are highly fossiliferous and the hard parts of marine organisms are in sufficient abundance to supply more than the necessary amount of phosphorus. The abundance of sinkholes in Florida today is ample evidence that these limestones were sufficiently soluble to be available to plants as food. Undoubtedly the soil conditions were similar to that in the Miami-Homestead area today. This area supports abundant vegetation when it receives sufficient rainfall.

Unfortunately there are no fossil plants found in the deposit in which the mammalian remains occur. However, it is permissible to suppose that the vegetation was similar to that found in the Miami-Homestead area today.

It is interesting that cement on the teeth of horses in quantity to be functionally advantageous should make its geologically earliest appearance in a region whose soil contained a superabundance of calcium and phosphorus. The deposition of cement around the roots of the teeth and a small amount at the base of the crown is nearly universal in the mammals. That the cement depositing organ should suddenly begin to deposit an excess of cement around the teeth is obviously the result of a change in the animal's physiology. The progressive specimens were able to utilize some of the abundant calcium, or what is *just as probable and just as important, they may have lacked the ability to excrete the excess calcium and were forced to utilize it.* The deposition of cement on the crown of the teeth was a genetically unstable character in all of the species of fossil horses in this deposit except *Merychippus gunteri.* In this species it arrived at a more or less stable quantity after a series of progressive changes from species to species, each having more than its parent, but each presenting a rather wide variation within the species. It would seem then that the deposition of a large amount of cement on the teeth was a hereditary factor which gained complete dominance in this stock at the time it reached the *Merychippus* stage of development.

CONCLUSIONS

The lenticular nature of the laminated clays and the unsorted material in the boulder bar show that the mammal bearing sediments were deposited in the channel of a stream which had arrived at grade. Although the data are not available to date exactly the beginning and end of the time interval represented by this deposit it is evident that it began after the deposition of the Suwannee limestone and was brought to a close by the invasion of the Hawthorne sea. The time interval is undoubtedly equivalent to most of the Tampa limestone

and the lower part of the Hawthorne formation. The Carnivora and the Artiodactyla have a decided Lower Miocene aspect, and both groups contain at least one genus which is not found on the Great Plains in deposits later than the Upper John Day. The Equidae and some of the Carnivora are very progressive and have as their closest relatives, forms which are found in the Middle and Upper Miocene deposits of the Plains. This disagreement with the stratigraphical data has a plausible explanation in that these forms developed on insular Florida and were unable to escape to the mainland till the end of Oak Grove time. It is thought (on the basis of the difference in the distribution of the Flint River and Tampa sediments) that the continental fauna had an opportunity to reach Florida during the Flint River-Tampa interval, but the evidence is not conclusive. If this should eventually prove to be untrue and that the only opportunity for this fauna to reach Florida was during the Glendon-Flint River interval it will be necessary to revise downward the correlation of the Upper Oligocene and Basal Miocene deposits of the Great Plains.

In only one species (*Parahippus leonensis* Sellards) are there enough specimens to note the amount of variation. It is possible to divide this series into three groups on the basis of the extremes of the variations which I shall refer to as the conservatives, progressives, and aberrant. The intergrades are sufficiently numerous that no specific separation is possible. The aberrations are not of a lethal or deleterious nature and show up occasionally in the milk teeth of *Merychippus*. They usually express themselves in unusual patterns of the crochet and as multiple plications on the metaloph. This may be the result of unusual activity of the endocrine glands during the time of the formation of the permanent teeth. In the case of the conservative and progressive specimens the difference may be that between sexes. If the principle of *Unequal Growth* is the correct explanation of the process of the folding of the enamel on the metaloph, it seems reasonable to suppose that the females, with a lower rate of metabolism, would have a less rapid proliferation of the enamel depositing cells and a simpler enamel pattern. However this question cannot be answered till associated skeletons are found.

This series of fossil horses furnish relatively detailed data on speciation in this group. Although the series is not complete, the gaps are so small that they can be bridged with no difficulty. These species (*Parahippus blackbergi-barbouri-leonensis-Merychippus gunteri*) are a monophyletic series illustrating the development of *Merychippus* from a very primitive species of *Parahippus*. In the end there is a condition

in which the difference between these two genera is no greater than that which exists between two species of the same genus. Speciation

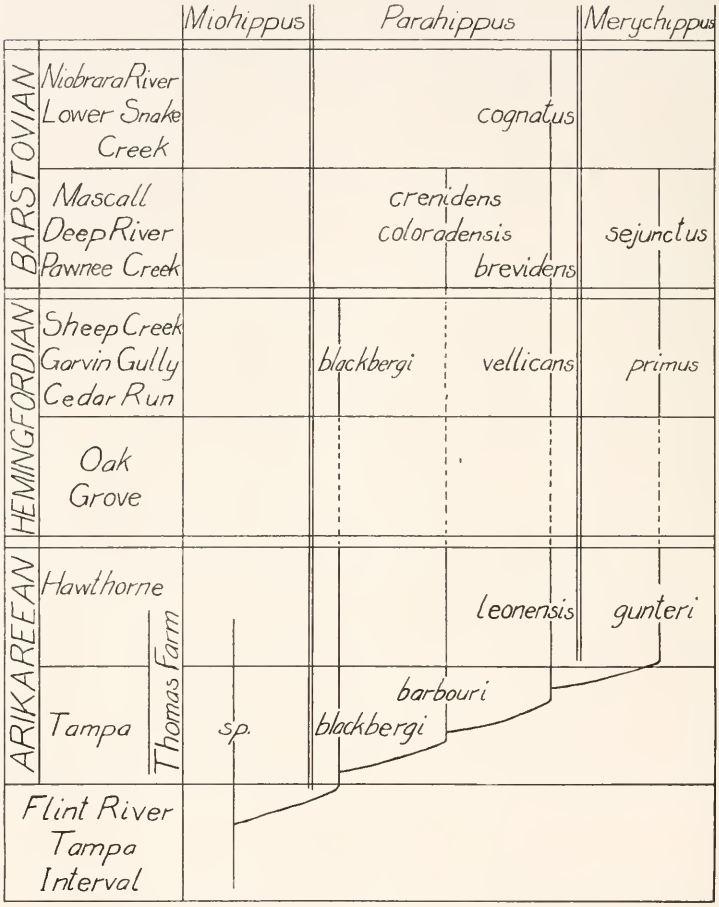

Fig. 10. Graphic representation of the relationships of some of the species of fossil horses.

proceeded rather rapidly and the whole process took place in a rather short period of time. Nor was the entire population transformed from one species into another but the new species split off from the parent

species by series of progressive changes and the two existed side by side for most of the remainder of the Miocene. Soon after the new species split off from the parent species it gave rise to another new species and so on. Unfortunately the record stops with the production of *Merychippus gunteri*. It would seem that a "high biotic potential" appeared in this stock and was passed on to each new species by robbing the parent species, although the parent species persisted, with diminishing abundance, till near the close of the Miocene. The idea is graphically represented in Text fig. 10. This is entirely compatible with the record of the appearance of major groups in geologic time. The data on speciation obtained from this series indicate that the phylogenetic relationships of species based on a series from a single time unit are more nearly correct than formerly supposed, because this picture would be essentially the same whether the series was taken from the Hawthorne, or Sheep Creek, or Deep River.

It is obvious from the above data that Natural Selection could have played no part in the development of *Merychippus* and that the causes of speciation are to be found within the animals themselves. The identification of the causes is the work of the physiologist, the endocrinologist, and the biochemist. The paleontologist can only catalogue the changes after they have taken place.

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EXPLANATION OF PLATES

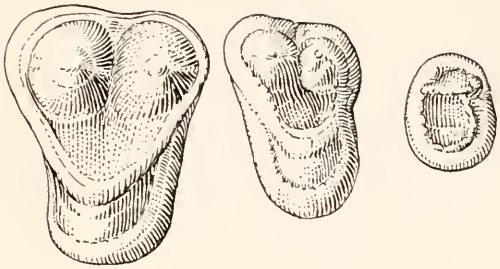
PLATE 1

PLATE 1

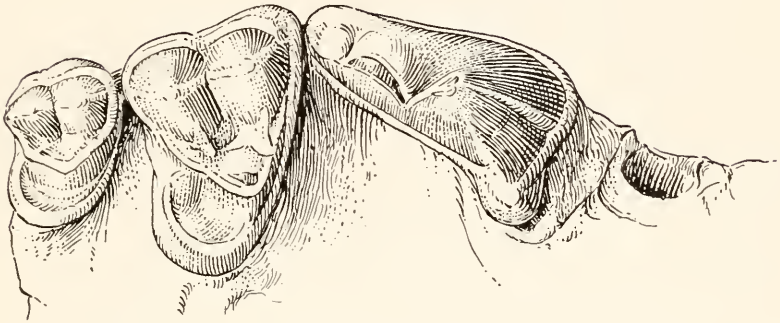
Fig. 1. *Daphaenus caroniarorus* spec. nov. Type, M.C.Z. No. 3727, Crown view of left M^{1-3}. x 2¼.

Fig. 2. *Paradaphaenus tropicalis* spec. nov. Type, M.C.Z. No. 3729, right P^4–M^2. x 2¼.

Fig. 3. *Nothocyon insularis* spec. nov. Type, M.C.Z. No. 3812, occlusal view of right P^4–M^2. x 2¼.



M.C.Z. 3727



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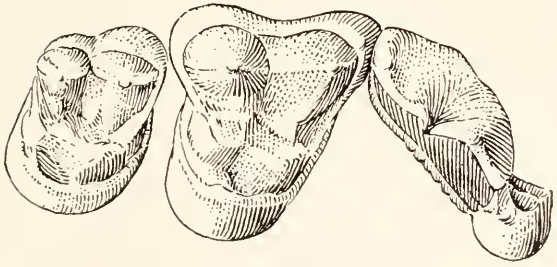


M.C.Z. 3812

PLATE 2

PLATE 2

Fig. 1. *Paradaphaenus nobilis* (Simpson). M.C.Z. No. 3725, occlusal view of left P^4–M^2. x 2⅛.

Fig. 2. *Tomarctus canavus* (Simpson). M.C.Z. No. 3813, occlusal view of left P^4–M^1. x 2⅛

M.C.Z. 3725

M.C.Z. 3813

PLATE 3

PLATE 3

Fig. 1. Lateral and Fig. 2, occlusal views of *Paradaphaenus nobilis* (Simpson). M.C.Z. No. 3724. x 1.

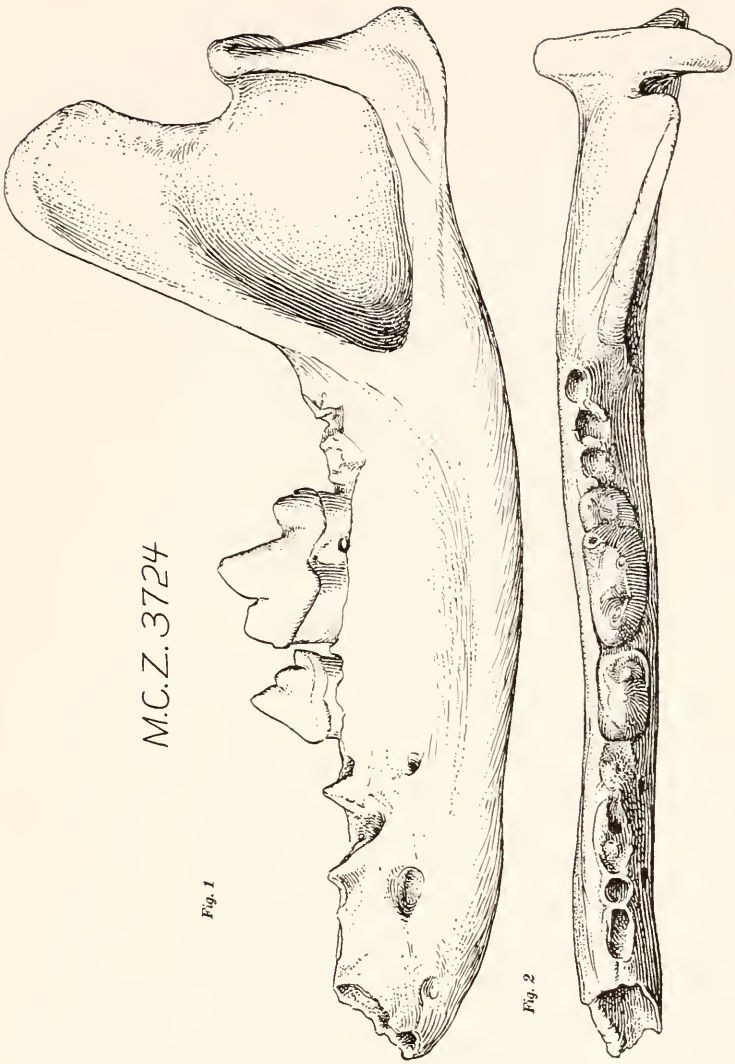


Fig. 1

Fig. 2

PLATE 4

PLATE 4

Fig. 1. Occlusal, and Fig. 2, lateral views of *Paradaphaenus tropicalis* spec. nov. Paratype, M.C.Z. No. 3714. x 1.

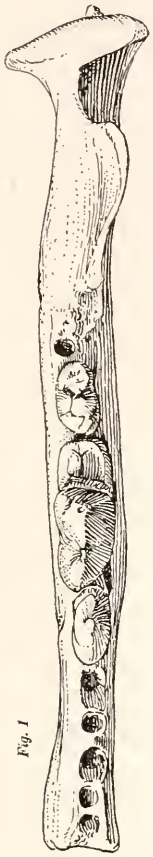


Fig. 1

PARATYPE, M.C.Z. 3714

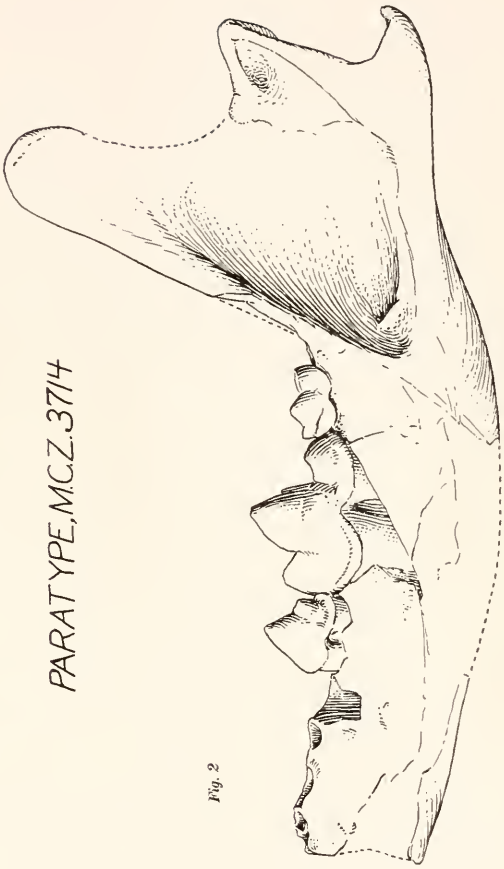


Fig. 2

PLATE 5

PLATE 5

Fig. 1. Occlusal, and Fig. 2, lateral views of *Amphicyon longiramus* spec. nov. Type, M.C.Z. No. 3919. x 1/2.

Fig. 1

TYPE, M.C.Z. 3919

Fig. 2

PLATE 6

PLATE 6

Fig. 1. Medial, Fig. 2, occlusal, and Fig. 3, lateral views of *Tomarctus canavus* (Simpson). M.C.Z. No. 3628. x 1.

Fig. 1

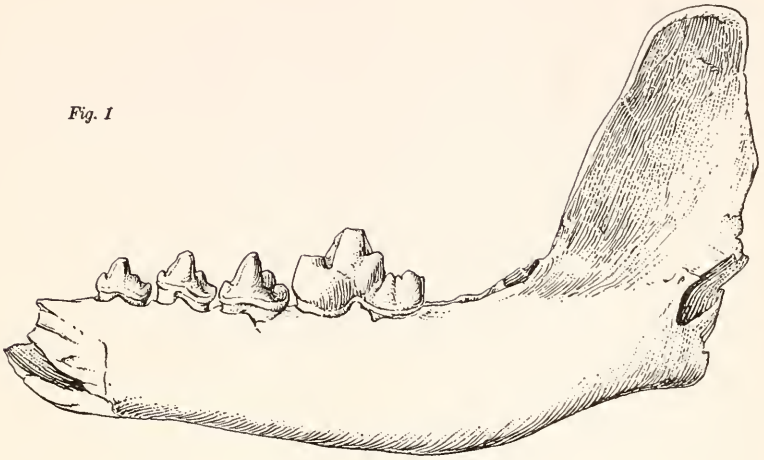


Fig. 2

M.C.Z. 3628

Fig. 3

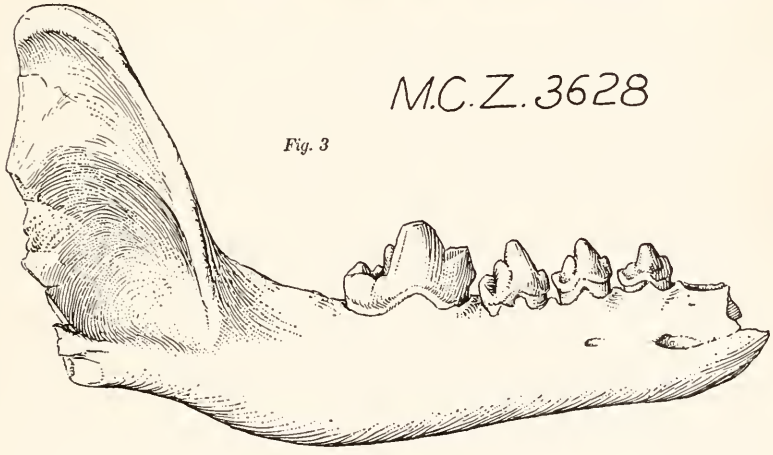


PLATE 7

PLATE 7

Fig. 1. Occlusal, and Fig. 2, lateral views of *Tomarctus thomasi* White. M.C.Z. No. 3712. x 1.

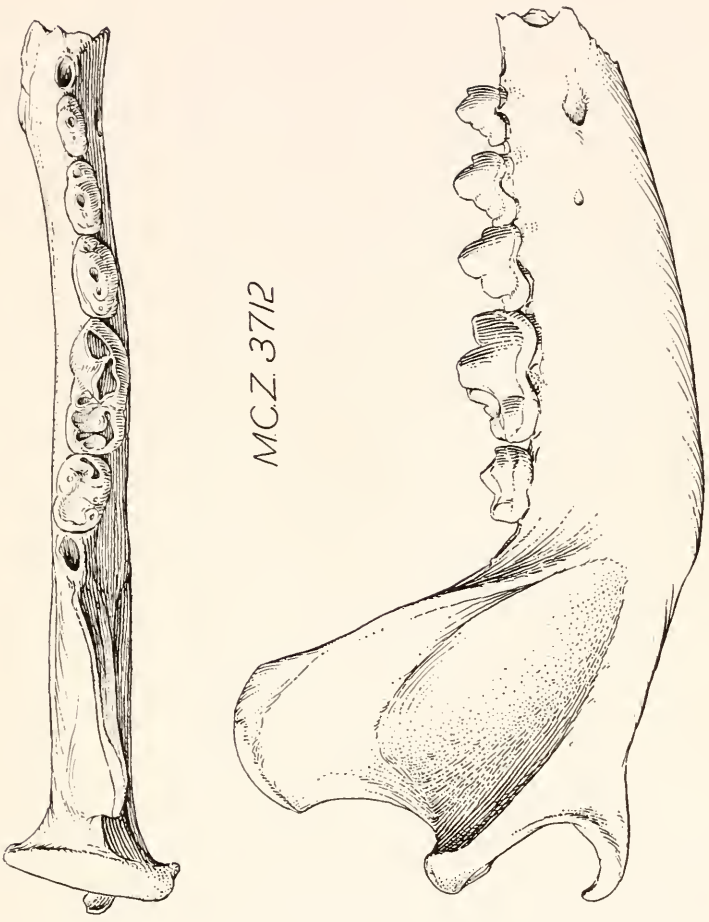

MCZ. 3712

PLATE 8

PLATE 8

Fig. 1. Palatal, and Fig. 2, lateral views of skull of *Hypermekops olseni* gen. et spec. nov. Genoholotype, M.C.Z. No. 3711. x 4/10. Fig. 3. Occlusal view of left P^2–M^3. x 4/5.

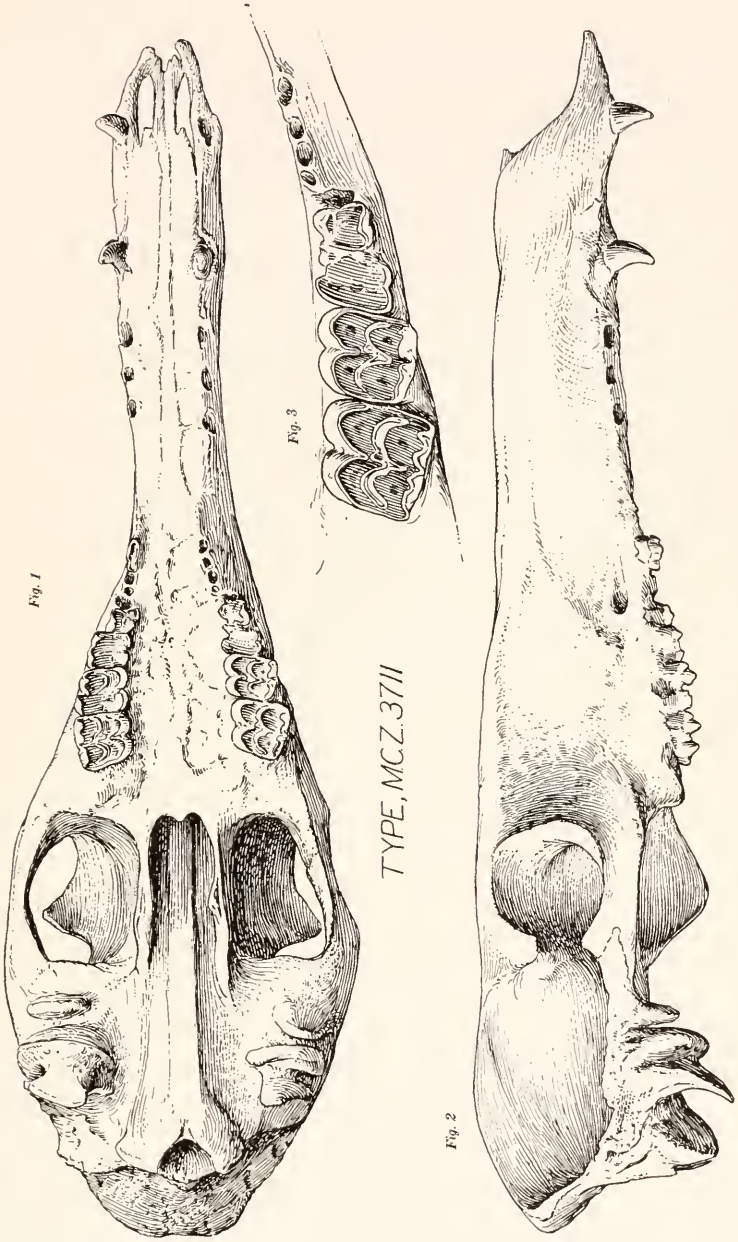


Fig. 1
Fig. 3
TYPE, MCZ. 3711
Fig. 2

PLATE 9

PLATE 9

Fig. 1. Lateral, and Fig. 2, occlusal views of left mandible of *Anchitherium clarencei* Simpson. M.C.Z. No. 3810. x 2/3.

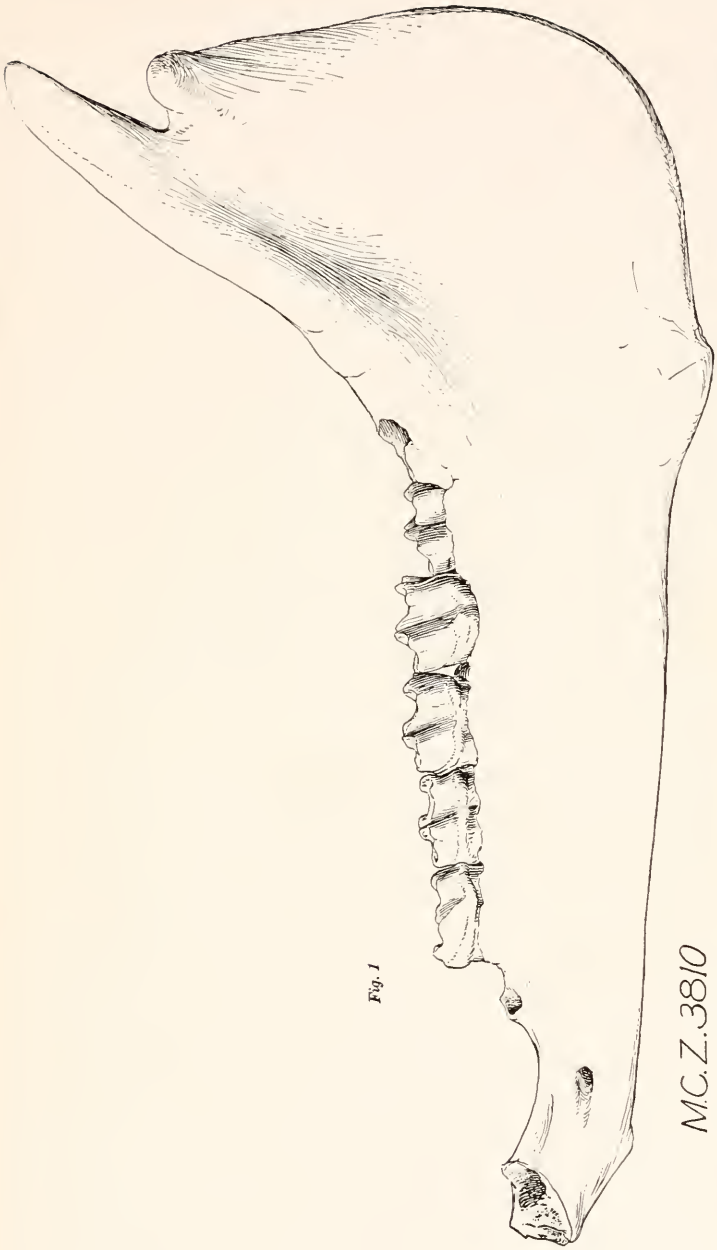


Fig. 1

M.C.Z. 3810

Fig. 2

PLATE 10

PLATE 10

Fig. 1. Occlusal view of left upper dentition of *Parahippus blackbergi* (Hay). M.C.Z. No. 3829. x 1½.

Fig. 2. Lateral, and Fig. 3, occlusal view of milk teeth and permanent molars of *Parahippus blackbergi* (Hay). M^3 has been artificially exposed. M.C.Z. No. 3840. x 1½.

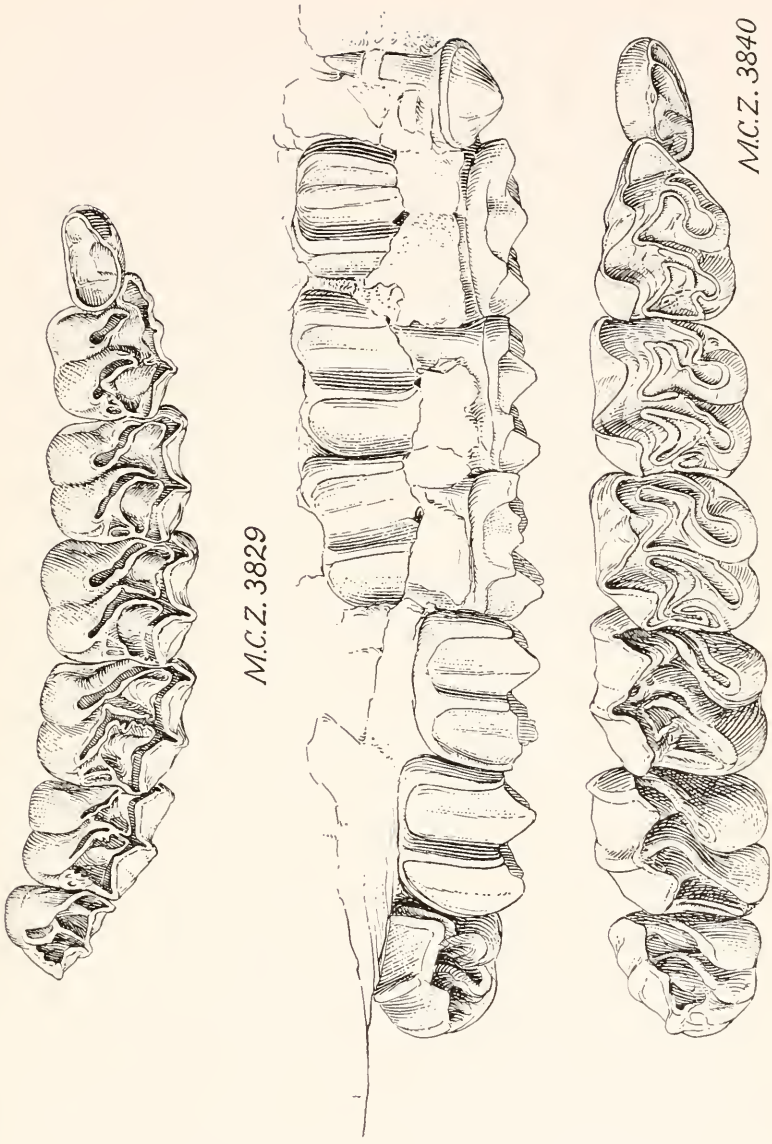

M.C.Z. 3829
M.C.Z. 3840

PLATE 11

PLATE 11

Fig. 1. Occlusal, and Fig. 2, lateral views of upper right cheek teeth of *Parahippus barbouri* spec. nov. Type, M.C.Z. No. 3646. x 1.

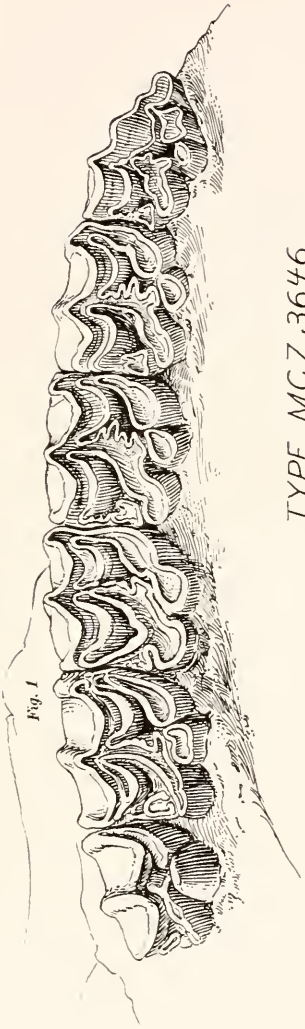


Fig. 1

TYPE, M.C.Z. 3646

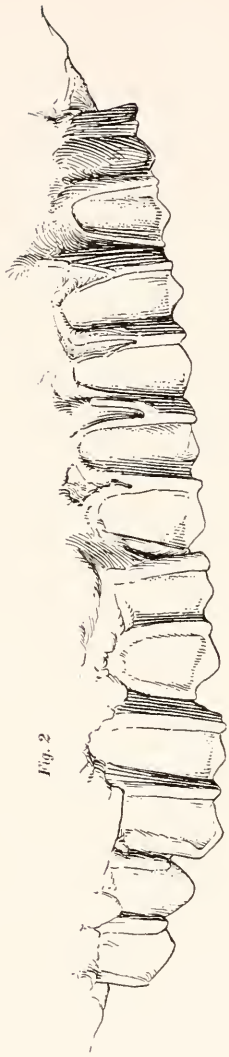


Fig. 2

PLATE 12

PLATE 12

Fig. 1. Occlusal, and Fig. 2, lateral views of right mandible of *Parahippus barbouri* spec. nov. Paratype, M.C.Z. No. 3814. x 1/2.

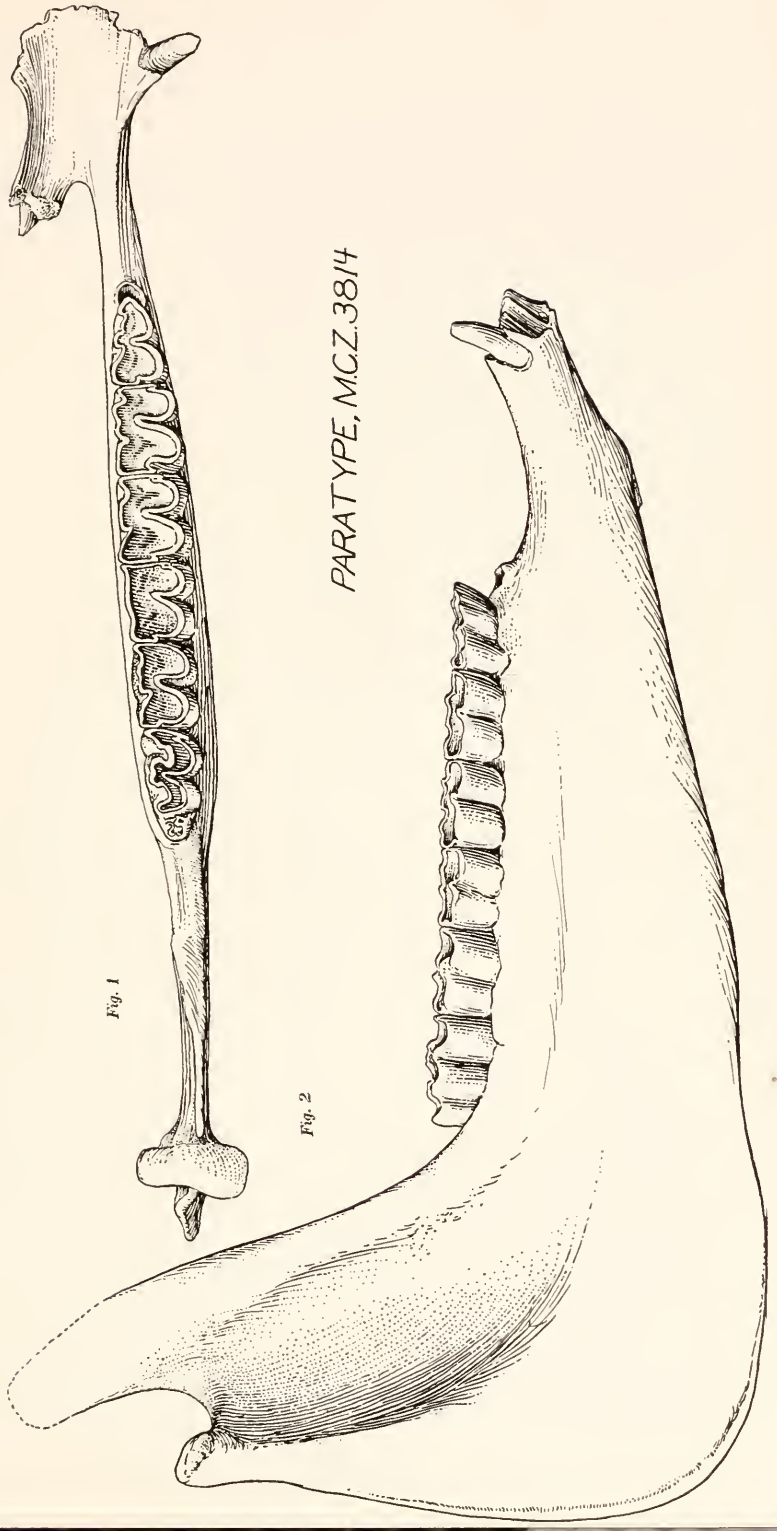


Fig. 1

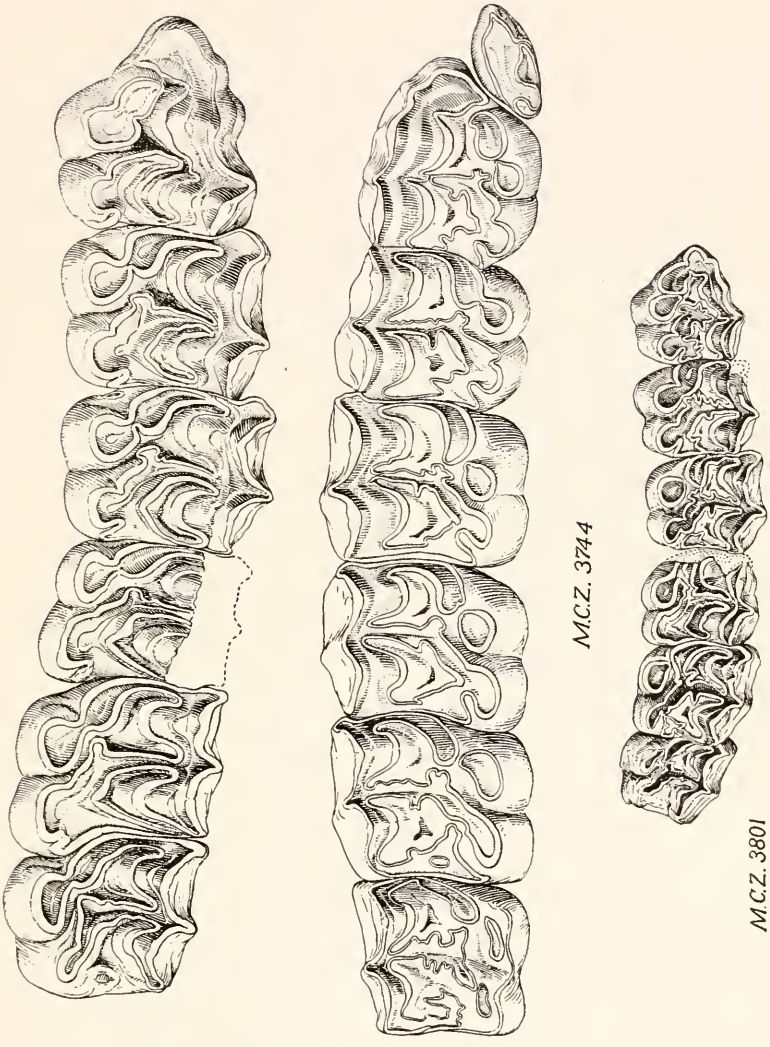
Fig. 2

PLATE 13

PLATE 13

Fig. 1. Conservative (M.C.Z. No. 3921), and Fig. 2, progressive (M.C.Z. No. 3744) specimens of *Parahippus leonensis* Sellards. x $1\frac{1}{3}$.

Fig. 3. *Merychippus gunteri* Simpson. M.C.Z. No. 3801. Occlusal view of upper right cheek teeth. x 4/5.



M.C.Z. 3744

M.C.Z. 3801

PLATE 14

PLATE 14

Details of the Excavation in North Florida. Fig. 1, diagrammatic plan of excavation. The dotted line indicates the approximate limits of the boulder bar, and the dashed line indicates the edge of the outlier of the Hawthorne formation. Fig. 2, Generalized section along line B^1–B. Fig. 3, Generalized section along line C^1–C. Fig. 4, generalized section along line A^1–A.

Fig. 1

Fig. 2

Fig. 3

Fig. 4

Bulletin of the Museum of Comparative Zoölogy
AT HARVARD COLLEGE
VOL. XCII, No. 2

FIRST SUPPLEMENT TO THE LIST OF TYPES OF BIRDS NOW IN THE MUSEUM OF COMPARATIVE ZOÖLOGY

BY JAMES L. PETERS

CAMBRIDGE, MASS., U. S. A.
PRINTED FOR THE MUSEUM
MARCH, 1943

Museum of Comparative Zoology
MAR 30 1948
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No. 2. — *First Supplement to the List of Types of Birds now in the Museum of Comparative Zoölogy*

By James L. Peters

In March 1930 was published in this Bulletin (**70**, 4, p. 147–426) a list of the types of birds then in the collection. The author was Outram Bangs, Curator of Birds, who between 1909 and the time of his death in 1932 built up the museum's bird collection from a small and inadequate one to one of the finest anywhere.

The List of Types was published as an anniversary volume and was first distributed on the evening of 17 March, 1930 at a meeting of the Nuttall Ornithological Club, when Bangs' fiftieth anniversary of election to membership in the Club was appropriately celebrated.

Since the publication of the first list of types, an open manuscript has been kept in anticipation of publishing a supplement at some future date. Comments on types made by Outram Bangs in the open manuscript are initialed O. B. Otherwise the author is responsible for such discussion. The time for publication of the supplemental list has now arrived, since it seems probable that no important ornithological discoveries based on exploration and new field work will be made for some years to come.

The order of this supplemental list is the same as that employed in the first list, *i.e.*, that of Sharpe's Hand-List. The dagger (†) indicates that the name is surely a synonym.

This also seems an opportune time to publish a bibliography of the writings of Outram Bangs; no such list has been published previously, and since Bangs' period of activity extended for nearly forty years and his articles appeared in many different journals, it is doubtful if a complete bibliography could be prepared without access to his own carefully kept set.

The task of preparing this bibliography was entrusted to Miss Margaret D. Porter (now Mrs. Chandler Bigelow) formerly a Research Assistant in the Bird Department, whose catalogues and card entries bear testimony to the many hours of painstaking care she put into her work.

TINAMIDAE

Crypturellus soui decolor Griscom and Greenway

Crypturellus soui decolor Griscom and Greenway, Bull. Mus. Comp. Zoöl., **81**, 2, May (=10 June), 1937, p. 417.

Type. No. 173012, ad. ♂; Brazil: Pará; Pinhy, on the right bank of the Rio Tapajóz; 15 June, 1933; A. M. Olalla.

Listed as No. 173021 in the original description due to typographical error.

CRACIDAE

Penelope superciliaris argyromitra Neumann

Penelope superciliaris argyromitra Neumann, Bull. Brit. Orn. Club, **53**, 31 January, 1933, p. 94.

Type. No. 160966, ad. ♀; Brazil: Central Goyaz, Veadeiros, near Forte, "2/12/" 1929; José Blaser.

Compared with birds from the Tapajóz and Santarem, Neumann's type differs chiefly in that the whitish superciliaries meet across the forehead; the superciliaries are broader than in specimens from Bahia and São Paulo. The type is much grayer (less green or bronzy) than any specimens of *P. superciliaris* in the Museum of Comparative Zoölogy; it is also in much more worn plumage than any skins of the species we possess.

Forte is in east-central Goyaz on the Rio Paranan, about 150 miles from its junction with the Tocantins.

Ortalis wagleri griseiceps van Rossem

Ortalis wagleri cinereiceps van Rossem, Bull. Mus. Comp. Zoöl., **77**, 7, 29 December, 1934, p. 431.

Type. No. 224937, ad. ♂; Mexico: Sonora, Alamos; 16 March, 1888; M. A. Frazar.

Ortalis garrula mira Griscom

Ortalis garrula mira Griscom, Bull. Mus. Comp. Zoöl., **72**, 9, 19 January, 1932, p. 318.

Type. No. 156508, ad. ♂; Eastern Panama: Ranchon, Caribbean slope; 20 January, 1931; H. Wedel.

PHASIANIDAE

Francolinus squamatus uzungwensis Bangs and Loveridge

Francolinus squamatus uzungwensis Bangs and Loveridge, Proc. New Eng. Zoöl. Club, **12**, 1931, p. 93.

Type. No. 148262, ad. ♂; Tanganyika Territory: Kigogo, Uzungwe Mountains; 30 January, 1931; A. Loveridge.

Ithaginis cruentus holoptilus Greenway

Ithaginis cruentus holoptilus Greenway, Bull. Mus. Comp. Zoöl., **74**, 5, 20 February, 1930, p. 113.

Type. No. 160786, ad. ♂; China: Yunnan, Likiang district, Chou-yu-gko, above Tao-mung-chung; east slopes of the Yangtse-Mekong Divide, 13,000 to 15,000 feet; April, 1931; Joseph F. Rock.

Pucrasia joretiana Heude

Pucrasia Joretiana Heude, Ibis, 1883, p. 225.

Cotype. No. 132657, from the La Touche Collection.

This skin is one of Heude's original specimens, and as such is a cotype. It was given, with that assurance, to La Touche by Father F. Courtois.

Heude gave no locality for his specimens, but without much doubt they came from the mountains of Anhwei Province, where the species has since been found to live.

Hartert is quite right, it seems to me, in carrying this peculiar short crested form as a distinct species. [O. B.]

ODONTOPHORIDAE

Cyrtonyx ocellatus differens Griscom

Cyrtonyx ocellatus differens Griscom, Proc. New Eng. Zoöl. Club, **13**, 7 November, 1932, p. 56.

Type. No. 161001, ad. ♂; Honduras: Hatillo; 8 May, 1932; C. F. Underwood.

Rhynchortyx cinctus hypopius Griscom

Rhynchortyx cinctus hypopius Griscom, Bull. Mus. Comp. Zoöl., **72**, 9, 19 January, 1932, p. 320.

Type. No. 155038, ad. ♀; Eastern Panama: Obaldia, Caribbean slope; 12 August, 1930; H. Wedel.

TURNICIDAE

Turnix sylvatica kinneari Neumann

Turnix sylvatica kinneari Neumann, Bull. Brit. Orn. Club, **59**, 1939, p. 91.
Type. No. 270547, ♀; Peling Island; 20 July, 1938; J. J. Menden.

PTEROCLIDIDAE

Pterocles senegallus remotus Neumann

Pterocles senegallus remotus Neumann, Anz. Orn. Ges. Bayern, **20**, 1934, p. 471.
Type. No. 166790, ad. ♂; India: Cutch, Kunaria, 300 ft.; 20 February, 1934; Sir G. F. Archer.

Pterocles orientalis enigmaticus Neumann

Pterocles orientalis enigmaticus Neumann, Bull. Brit. Orn. Club, **55**, 31 December, 1934, p. 73.
Type. No. 166788, ad. ♂; India: near Rann of Cutch; 1 January, 1934; Sir G. F. Archer.

Pterocles lichtensteinii nigricans Neumann

Pterocles lichtensteinii nigricans Neumann, Bull. Brit. Orn. Club, **55**, 31 December, 1934, p. 72.
Type. No. 166786, ad. ♂; southern Ethiopia: Suksuk River (between Lake Zwai and Afchafdo); 6 April, 1925; Oscar Neumann.

COLUMBIDAE

Leucotreron subgularis restrictus Ripley

Leucotreron subgularis restrictus Ripley, Occ. Papers Boston Soc. Nat. Hist., **8**, 3 March, 1941, p. 349.
Type. No. 166923, ad. ♂; Celebes: Gimpoe, 22 August, 1917; H. C. Raven.

Macropygia amboinensis atrata Ripley

Macropygia amboinensis atrata Ripley, Occ. Papers Boston Soc. Nat. Hist., **8**, 3 March, 1941, p. 351.
Type. No. 270115, ad. ♂; Togian Islands: Oena Oena, 3 September, 1939; J. J. Menden.

Streptopelia vinacea bailunduensis Neumann now Streptopelia capicola bailunduensis Neumann

Streptopelia vinacea bailunduensis Neumann, Verh. Orn. Ges. Bayern, **20**, Heft 1, 1933, p. 226.

Type. No. 165837, ad. ♂; Benguella: Bailundu, Chipepe, 7 July, 1928; Paul Koester.

This form is apparently most nearly related to *S. c. damarensis* (Finish and Hartlaub). Neumann considers the "Artenkreise" *Streptopelia capicola* and *S. vinacea* as belonging to the same "formenkreis", but I follow Sclater and other recent writers on African birds in considering the two distinct. Those adhering to the latter as the correct view will call this bird *S. capicola bailunduensis.*

Claravis mondetoura umbrina Griscom

Claravis mondetoura umbrina Griscom, Occ. Papers Boston Soc. Nat. Hist., **5**, 1930, p. 288.

Type. No. 116433, ad. ♀; Costa Rica: La Estrella de Cartago; 28 December, 1900; C. F. Underwood.

Claravis mondetoura pulchra Griscom

Claravis mondetoura pulchra Griscom, Occ. Papers Boston Soc. Nat. Hist., **5**, 1930, p. 288.

Type. No. 109178, ad. ♂; western Panama: Boquete; 27 March, 1901; W. W. Brown.

Leptotila plumbeiceps notius Peters

Leptotila plumbeiceps notius Peters, Bull. Mus. Comp. Zoöl., **71**, 1931, p. 298.

Type. No. 137625, ad. ♂; Panama: Almirante; 15 November, 1928; H. Wedel.

Leptotila rufaxilla hypochroos Griscom and Greenway

Leptotila rufaxilla hypochroos Griscom and Greenway, Bull. Mus. Comp. Zoöl., **81**, 2, May (=10 June), 1937, p. 419.

Type. No. 143253, ad. ♂; Surinam: Paramaribo; 26 July, 1914; native collectors for T. E. Penard.

Oreopeleia lawrencii lentipes Peters

Oreopelia [sic] *lawrencii lentipes* Peters, Bull. Mus. Comp. Zoöl., **71**, 1931, p. 300.

Type. No. 121126, ad. ♂; Costa Rica: Tenorio; 11 February, 1908; C. F. Underwood.

RALLIDAE

Rallus longirostris belizensis Oberholser

Rallus longirostris belizensis Oberholser, Proc. U. S. Nat. Mus., **84**, 3018, 30 June, 1937, p. 335.

Type. No. 119747, ad. ♀; British Honduras: Ycacos Lagoon; 14 May, 1907; Morton E. Peck.

Rallus striatus insulsus Greenway

Rallus striatus insulsus Greenway, Proc. New England Zoöl. Club, **14**, 1 February, 1935, p. 28.

Type. No. 167023, ad. ♀; northeastern New Guinea: Morobé district, Wau, 3800 feet; 15 May, 1932; Herbert Stevens.

Porzana albicollis typhoeca Peters

Porzana albicollis typhoeca Peters, Proc. New England Zoöl. Club, **13**, 19 December, 1932, p. 66.

Type. No. 141834, ad. ♀; Colombia: Santa Marta, Rio Frio; 21 August, 1928; P. J. Darlington, Jr.

Porzana flaviventer bangsi Darlington

Porzana flaviventer bangsi Darlington, Bull. Mus. Comp. Zoöl., **71**, 1931, p. 372.

Type. No. 141831, ad. ♂; Colombia: Santa Marta region, Cienaga; April 13, 1929; P. J. Darlington, Jr.

COLYMBIDAE

Colymbus dominicus bangsi van Rossem and Hachisuka

Colymbus dominicus bangsi van Rossem and Hachisuka, Trans. San Diego Soc. Nat. Hist., **8**, 15 June, 1937, p. 323.

Type. No. 218269, ad. ♀; Lower California: Santiago; 15 November, 1887; M. A. Frazar.

ALCIDAE

Catarractes californicus Bryant
now Uria aalge californicus (Bryant)

Catarractes californicus Bryant, Proc. Boston Soc. Nat. Hist., **8**, 1861, p. 142.

Cotype. No. 46265, ad. ♂; Farallon Islands, California, (probably collected by Ferdinand Gruber, summer of 1860). Bryant Collection No. 1156.

When Penard and I wrote an account of the types of the birds described by Dr. Henry Bryant (Bull. Mus. Comp. Zoöl., **67**, 3,

June 1925) we did not claim type or cotype of *Catarractes californicus*. At the time the type was supposed to be No. 17402 in the United States National Museum, and our beautiful specimen, No. 1156 Bryant Collection, we, rather reluctantly, did not mention at all.

Lately Grinnell (Type Localities of Birds Described from California, Univ. of Cal. Publ. Zool., **38**, 3, 1932, p. 273) says that No. 17402 is not now in the National Museum, "having probably been given away or exchanged under a policy of distribution obtaining under the Bairdian regime". It seems to me that very likely it was given to Dr. Bryant (and is No. 1156 of his collection) who at that time received many skins from the National Museum.

I therefore immediately sent the Bryant Collection specimen to Dr. Grinnell, who after carefully examining it very kindly wrote, "I am sending back to you the undoubted cotype of *Catarractes californicus* Bryant. I grant that it may be the type — in that it might be the missing number 17402 of the National Museum. Its bill certainly fits Bryant's drawing 'No. 3. C. californicus adult' ".

I agree with Grinnell that it is, on the whole, best to regard this skin and the one still in the National Museum No. 17407, as cotypes rather than to assume that our specimen is the missing No. 17402 and therefore the holotype.

Bryant followed the custom of his time and removed original labels and substituted his own on all birds he acquired in exchange or by purchase. For that reason we can now but guess the original number of the present skin. [O. B.]

LARIDAE

Sterna bengalensis emigrata Neumann
now Thalasseus bengalensis emigratus (Neumann)

Sterna bengalensis emigrata Neumann, Anz. Orn. Ges. Bayern, **2**, 8 March, 1934, p. 331.

Type. No. 160968, ad. ♀; Morocco: Tangier Region; Oleese.

PSOPHIIDAE

Psophia viridis interjecta Griscom and Greenway

Psophia viridis interjecta Griscom and Greenway, Bull. Mus. Comp. Zoöl., **81**, 2, May (=10 June), 1937, p. 419.

Type. No. 173207, ad. ♂; Brazil: Pará, Cavietá on the left bank of the Rio Tocantins; 20 December, 1932; A. M. Olalla.

ARDEIDAE

Nycticorax caledonicus cancrivorus Neumann

Nycoticorax caledonicus cancrivorus Neumann, Orn. Monatsb., **38**, 1930, p. 18.
Type. No. 153638, ad. ♀; Bismarck Archipelago: Uatom Island; 13 December, 1928; Pater Otto Meyer. Bought from Professor Oscar Neumann.

SULIDAE

Sula leucogaster yamashinae Neumann

Sula leucogaster yamashinae Neumann, Anz. Orn. Ges. Bayern, **2**, 1932, p. 146.
Type. No. 153637, ad. ♀; Bonin Archipelago: Chichishima Island; 22 January, 1930; Marquis Yamashina's collectors. Bought from Professor Oscar Neumann.

PHAETHONTIDAE

Phaëthon aethereus mesonauta Peters

Phaëthon aethereus mesonauta Peters, Occ. Papers Boston Soc. Nat. Hist., **5** April 15, 1930, p. 261.
Type. No. 238017, ad. ♀; Panama: Swan Key, Almirante Bay; 3 June, 1927; H. Wedel.

Phaëthon aethereus limatus Peters

Phaëthon aethereus limatus Peters, Occ. Papers Boston Soc. Nat. Hist., **5**, April 15, 1930, p. 261.
Type. No. 65699, ad. ♂; Galapagos Archipelago: Tower Island; 3 September, 1891; G. Baur.

ACCIPITRIDAE

Micrastur mirandollei extimus Griscom and Greenway

Micrastur mirandollei extimus Griscom and Greenway, Bull. Mus. Comp. Zoöl., **81**, 2, May (=10 June), 1937, p. 418.
Type. No. 155116, ad. ♀; Panama: Permé, on the Caribbean coast of extreme eastern Darien; 16 April, 1929; H. Wedel.

Geranospiza caerulescens flexipes Peters

Geranospiza caerulescens flexipes Peters, Proc. Biol. Soc. Wash., **48**, 3 May, 1935, p. 72.
Type. No. 99141, ad. ♀; Argentina: Chaco, Resistencia; 18 July, 1915; J. Mogensen.

Buteo jamaicensis solitudinis Barbour

Buteo jamaicensis solitudinis Barbour, Occ. Papers Boston Soc. Nat. Hist., **8**, 24 July, 1935, p. 207.

Type. No. 168467, ♀; Cuba: Soledad, (near Cienfuegos); 20 March, 1935; Thomas Barbour.

Chondrohierax uncinatus aquilonis Friedmann

Chondrohierax uncinatus aquilonis Friedmann, Journ. Wash. Acad. Sci., **24**, 7, 15 July, 1934, p. 314.

Type. No. 113711, ad. ♂; Mexico: Tamaulipas; 9 April, 1900; F. B. Armstrong.

No collector's name is given on the original label; the bird was originally in the Bangs Collection and was given to Outram Bangs by John E. Thayer who presumably purchased it from C. K. Worthen. The original label is a small tag written in Frank B. Armstrong's hand.

Chondrohierax uncinatus immanis Friedmann

Chondrohierax uncinatus immanis Friedmann, Journ. Wash. Acad. Sci., **24**, 7, 15 July, 1934, p. 315.

Type. No. 149835, not sexed (♀ by plumage); Ecuador: Oriente, Ambata. Reinberg.

This specimen was presented to the Museum by Dr. Alfred O. Gross who purchased it while in Ecuador in 1927; prior to Friedmann's work on Chondrohierax it was believed to represent *megarhynchus*. The bird had no original label; the data being transcribed onto one of Dr. Gross' collection labels. The skin is not quite characteristic of the well known "Quito Trade Skin", but is stuffed with the same kind of dried moss. The locality should probably be spelled Ambato; Dr. Chapman (Bull. Am. Mus. Nat. Hist., **55**, 1926, p. 703) states that this is "a town in a warm valley of the interandine table-land" but that a small collection of native-made skins said to have come from there proved to be from the eastern slope of the Andes.

STRIGIDAE

Bubo ketupu aagaardi Neumann
now Ketupa ketupu aagaardi (Neumann)

Bubo ketupu aagaardi Neumann, Bull. Brit. Orn. Club, **55**, 30 April, 1935, p. 138.

Type. No. 170620, ♀; southern Siam: Bang Nara, 25 July, 1932; K. Gercke.

Purchased from Professor Oscar Neumann.

Bubo ketupu pageli Neumann
now Ketupa ketupu pageli (Neumann)

Bubo ketupu pageli Neumann, Bull. Brit. Orn. Club, **55**, 30 April, 1935, p. 138.
Type. No. 170619, no sex; British North Borneo: Bengköka River, Marudo Bay; 2 May, 1893; Pagel.

Purchased from Professor Oscar Neumann.

Bubo bubo inexpectatus La Touche

Bubo bubo inexpectatus La Touche. A Hand Book of the Birds of Eastern China, Vol. 2, part 2, January, 1932, p. 113.
Type. No. 88359, ad. ♂; China: Chihli, Chin Lung Shan, 12 February, 1922; F. R. Wulsin.

Pulsatrix perspicillata chapmani Griscom

Pulsatrix perspicillata chapmani Griscom, Bull. Mus. Comp. Zoöl., **72**, 9, January 19, 1932, p. 325.
Type. No. 155173, ad. ♂; eastern Panama: Permé, Caribbean slope of Darien; 2 May, 1929; H. Wedel.

Otus asio var enano "Lawr. Ms."
now Otus trichopsis trichopsis (Wagler)

Otus asio var *enano* "Lawr. Ms." Baird and Ridgway, Bull. Essex Inst., **5**, 12, 1873, p. 200; "Eastern Mexico, south to Guatemala".
Scops trichopsis Wagler, Isis von Oken, 1832, col. 276.
Cotype. No. 72899; Guatemala. No exact locality, date and collector not known; received from the Boston Society of Natural History.

In their original description of this bird, Baird and Ridgway state definitely that "this well marked race is founded upon a specimen from Mexico in Mr. Lawrence's cabinet and one from Guatemala in the Museum of the Boston Society. The two are alike in colors, but as might be expected, the southern one is smaller". Since neither specimen is designated as the type, both of course rank equally as cotypes, though the bird from the Lawrence collection, now no. 44811 in the American Museum of Natural History, has long arbitrarily been considered the type and the equally valid claim of the Boston Society bird overlooked or ignored.

For further discussion of the application of this name see Moore and Peters, Auk, **56**, 1939, p. 45–46.

Lophostrix cristata wedeli Griscom

Lophostrix cristata wedeli Griscom, Bull. Mus. Comp. Zoöl., **72**, 9, 19 January, 1932, p. 326.

Type. No. 155180, ad. ♀; eastern Panama: Permé, Caribbean slope of Darien; 2 November, 1929; H. Wedel.

Glaucidium minutissimum rarum Griscom

Glaucidium minutissimum rarum Griscom, Proc. New. England Zoöl. Club, **12**, 1931, p. 41.

Type. No. 155189, ad. ♂; Panama: Permé, Caribbean slope; 14 July, 1929; H. Wedel.

TYTONIDAE

Tyto alba hellmayri Griscom and Greenway

Tyto alba hellmayri Griscom and Greenway, Bull. Mus. Comp. Zoöl., **81**, 2, May (=10 June), 1937, p. 421.

Type. No. 143296, ad. ♀; Surinam: Paramaribo; 30 January, 1913; native collectors for T. E. Penard.

Tyto rosenbergi pelengensis Neumann

Tyto rosenbergi pelengensis Neumann, Bull. Brit. Orn. Club, **59**, 21 April, 1939, p. 92.

Type. No. 270559, ♂; Peling Island; 22 August, 1938; J. J. Menden.

Tyto capensis libratus Peters and Loveridge

Tyto capensis libratus Peters and Loveridge, Proc. Biol. Soc. Wash., **48**, 3 May 1935, p. 77.

Type. No. 168653, ad. ♀; Kenya Colony: Kakamega district, Kaimosi; 21 February, 1834; Arthur Loveridge.

PSITTACIDAE

Trichoglossus (Charmosyna) arfaki A. B. Meyer now Oreopsittacus arfaki arfaki (A. B. Meyer)

Trichoglossus (Charmosyna) Arfaki A. B. Meyer, Verh. Zool-bot. Ges. Wien, **24**, 1874, p. 37.

Cotype. No. 158946, ♀; New Guinea: Arfak, Hattam, 3500 feet; July, 1873; Dr. Adolf Bernard Meyer.

Bought of Rosenberg in January, 1936, and presented by Dr. Thomas Barbour.

This is the specimen figured in Rowley's "Ornithological Miscellany", **1**, pt. 3, 1876, pl. to text p. 145–148. According to Rowley the plate was drawn from a female bearing the data set forth above. Dr. Meyer described *arfaki* from a series and did not designate a holotype, hence our specimen is a cotype. On the reverse of the original label is the number 972 (in ink), which I judge to be the field number of the specimen; it is probably not a Rowley collection number since other specimens from the Rowley collection are not numbered. Also on the reverse side is written in pencil "Trichoglossus Arfaki Meyer, Type", but I am unable to identify the handwriting.

Nasiterna pygmaea geelvinkiana Schlegel
now Micropsitta geelvinkiana geelvinkiana (Schlegel)

Nasiterna pygmaea Geelvinkiana Schlegel, Nederl. Tijdschr. Dierk., **4**, 1873 (1871), p. 7; Mafor and Misori.

Cotype. No. 158948, ♂; "Nufoor", 13 February, 1869; [von Rosenberg] original number 229.

Cotype. No. 158947; ♀; "Nufoor", 13 February, 1869; [von Rosenberg] original number 231.

Both these birds were figured in Rowley's "Ornithological Miscellany" **1**, pt. 3 pl. 1876, accompanying text, p. 152–160; on p. 157, Rowley writes that the specimens figured are nos. 231 ♀ and 229 ♂.

While Rosenberg's name was added in pencil on the original label, this was done at a subsequent date, since the writing does not agree with the hand that penned the data. There is no doubt, however, that these birds were actually taken by Rosenberg and form a part of the original type series on which Schlegel based *geelvinkiana*, since Schlegel states that Rosenberg was on Numfor (now Mafor) from January to March, 1869. In his original description Schlegel pointed out differences between the birds from Mafor and Misori but did not separate them; later Salvadori renamed both forms as *maforensis* and *misorien-sis* respectively because Schlegel's name covered two separate races; this procedure is not in accord with ordinary nomenclatural practice and Rothschild and Hartert in Nov. Zool., **8**, 1901, p. 90, were quite right in restricting Schlegel's name to one of the two forms, in this case to the Mafor bird, and allowing one of Salvadori's to stand for the Misori bird.

This nice little pair was bought from W. F. H. Rosenberg the

London dealer, in January 1936, and presented to the Museum by Dr. Thomas Barbour.

Amazona amazonica micra Griscom and Greenway

Amazona amazonica micra Griscom and Greenway, Bull. Mus. Comp. Zoöl., **81**, 2, May (=10 June), 1937, p. 420.

Type. No. 143325, ad. ♂; Surinam: Paramaribo; 18 January, 1913; native collectors for T. E. Penard.

Graydidascalus brachyurus insulsus Griscom and Greenway

Graydidasculus [sic] *brachyurus insulsus* Griscom and Greenway, Bull. Mus. Comp. Zoöl., **81**, 2, May (=10 June), 1937, p. 420.

Type. No. 173516, ad. ♂; Brazil: Lago Grande on the south bank of the Amazon; 9 September, 1932; A. M. Olalla.

Poicephalus reichenowi Neumann

Poicephalus reichenowi Neumann, Journ. f. Orn., **46**, 1898, p. 501.

Cotype. No. 160972, ad. ♀; Angola: Quango; 3 January, 1881; von Mechow.

This distinct species was originally described from a series without designation of a holotype; on the reverse of the label is a note in Professor Neumann's own hand; it reads: — "this is one of the nine typical specimens . . . I have myself never designated a type. O. N."

Tanygnathus talautensis Meyer and Wiglesworth now Tanygnathus lucionensis talautensis Meyer and Wiglesworth

Tanygnathus talautensis Meyer and Wiglesworth, Abh. Ber. K. Zoöl. Mus. Dresden, 1894–95, 1895, no. 9, p. 2.

Cotype. No. 97345, ad. ♀; Talaut Islands: Karkellang, Melumbuane; 8 November 1894; Charles W. Cursham's collectors. Received in exchange with the Dresden Museum.

Meyer and Wiglesworth state in their original description that they first received three specimens from Kabruang, Talaut Islands, but did not distinguish these birds from the typical race; subsequently the receipt of ten additional skins from Karkellang and Esang made it clear that a well marked race was involved which they proceeded to name as above. No specimen was designated as the holotype in the original description and our bird, as one of the original series in the Dresden Museum, ranks as a cotype.

However, in Meyer and Wiglesworth's Birds of Celebes (Vol. I,

1898, p. 145) appears the statement "ad. Karkellang C 13766, type of species; and others." This would seem to be a subsequent selection of a holotype and those who believe in this practice will deny the claim of our specimen to be a cotype. It formerly bore the number C 13767 in the Dresden Museum.

ALCEDINIDAE

Ceyx erithacus captus Ripley

Ceyx erithacus captus Ripley, Proc. New England Zoöl. Cl., **19**, 29 December, 1941, p. 15.

Type. No. 194799, ad. ♂, Dutch East Indies: Nias, Soliga; 2 August 1937; Barbara Lawrence.

CAPRIMULGIDAE

Lurocalis semitorquatus noctivagus Griswold

Lurocalis semitorquatus noctivagus Griswold, Proc. New England Zoöl. Club, **15**, 13 July, 1936, p. 101.

Type. No. 171659, ad. ♀; Canal Zone: Rio Pequeni, Salamanca Hydrographic Station; 21 February, 1936; J. A. Griswold, Jr.

Hydropsalis climacocerca canescens Griscom and Greenway

Hydropsalis climacocerca canescens Griscom and Greenway, Bull. Mus. Comp. Zoöl., **81**, 2, May (=10 June), 1937, p. 425.

Type. No. 173621, ad. ♂; Brazil: Lago Grande on the south bank of the Amazon west of the mouth of the Tapajóz; 11 September, 1932; A. M. Olalla.

In a paper (Ann. Carnegie Mus., **25**, p. 245) published 6 November, 1937, Mr. W. E. Clyde Todd described two additional races of *Hydropsalis climacocerca;* one (*H. c. pallidior*) from Santarem, the other (*H. c. intercedens*) from islands in the Amazon River opposite Obidos. Thus there are three named forms inhabiting a stretch of the Amazon River not much over sixty-five miles long. It is quite probable that with larger series it will prove necessary to sink one or more of the proposed races as a synonym.

Nyctiphrynus ocellatus brunnescens Griscom and Greenway

Nyctiphrynus ocellatus brunnescens Griscom and Greenway, Bull. Mus. Comp. Zoöl., **81**, 2, May (=10 June), 1937, p. 422.

Type. No. 169363, ad. ♂; Brazil: Bahia, Fazenda Santa Maria on the Rio Gongogy; 12 April, 1932; W. Garbe.

Nyctipolus nigrescens duidae Griscom and Greenway

Nyctipolus nigrescens duidae Griscom and Greenway, Bull. Mus. Comp. Zoöl., **81**, 2, May (=10 June), 1937, p. 423.

Type. No. 147396, ad. ♂; Venezuela: Mt. Duida, Valle de los Monos, 725 metres; 9 November, 1928; A. M. Olalla.

Caprimulgus rufus minimus Griscom and Greenway

Caprimulgus rufus minimus Griscom and Greenway, Bull. Mus. Comp. Zoöl., **81**, 2, May (=10 June), 1937, p. 424.

Type. No. 114053, ad. ♀; Panama: Panama City; 6 May, 1904; W. W. Brown.

Caprimulgus koesteri Neumann

now Caprimulgus poliocephalus koesteri Neumann

Caprimulgus koesteri Neumann, Journ. fur Orn., **79**, Heft 4, October, 1931, p. 550.

Type. No. 165862, not sexed but apparently a ♂; Benguella: Bailundoland, Lebule near Luimbale; Paul Koester.

HEMIPROCNIDAE

Hemiprocne comata barbarae Peters

Hemiprocne comata barbarae Peters, Bull. Mus. Comp. Zoöl., **86**, 2, 27 November, 1939, p. 95.

Type. No. 194255, ♂; Philippine Islands: Mindoro, Naujan, Bayog, 2 May, 1937; F. S. Rivera.

This form is named in honor of Miss Barbara Lawrence of the staff of the Museum of Comparative Zoölogy who in 1937 collected birds and mammals in the Philippine Islands and who secured Señor Rivera's services to collect birds on Mindoro.

Hemiprocne comata stresemanni Neumann

Hemiprocne comata stresemanni Neumann, Bull. Brit. Orn. Club, **57**, 30 June, 1937, p. 151.

Type. No. 158923, ♂; Mentawi Archipelago: North Pagi Island, 10 January, 1935; J. J. Menden.

No specimen identified by a museum number was designated as the type by Professor Neumann in his description of this race, but his statement that the type of this (and three other birds named at the

same time) is in the Museum of Comparative Zoölogy coupled with the fact that the bird is marked "typus" in Professor Neumann's hand establishes definitely its right to being the holotype. Furthermore, the sex of the type is given as male and of the five males and three females from North Pagi Island compared by Neumann the Museum of Comparative Zoölogy has only a pair.

In the original description the date of collection is given as 10 January, 1934. 1935, however, is correct; Menden collected on North Pagi between 8 December, 1934, and 31 January, 1935 with a brief trip to South Pagi near the end of January.

TROCHILIDAE

Eutoxeres aquila munda Griscom

Eutoxeres aquila munda Griscom, Bull. Mus. Comp. Zoöl., **72**, 9, 19 January, 1932, p. 330.

Type. No. 155290, ad. ♂; Panama: Obaldia, Caribbean slope of eastern Darien; 2 November, 1929; H. Wedel.

Eutoxeres aquila viridior Griscom

Eutoxeres aquila viridior Griscom, Bull. Mus. Comp. Zoöl., **72**, 9, 19 January, 1932, p. 331.

Type. No. 124578, ad. ♂; Colombia: Naranjito, Rio Dagua, 22 June, 1908; M. G. Palmer.

In the original description the type was given as "No. 124576". This is an error, the type marked by the describer as such is No. 124578. No. 124576 was not in the collection at the time (it had been exchanged) and is from another place — La Maria.

Phaeochroa cuvierii maculicauda Griscom

Phaeochroa cuvierii maculicauda Griscom, Bull. Mus. Comp. Zoöl., **72**, 9, 19 January, 1932, p. 332.

Type. No. 122617, ad. ♂; Costa Rica: Bolson, 10 December, 1907; C. F. Underwood.

Lepidopyga caeruleogularis confinis Griscom

Lepidopyga caeruleogularis confinis Griscom, Bull. Mus. Comp. Zoöl., **72**, 9, 19 January, 1932, p. 333.

Type. No. 155316, ad. ♂; eastern Panama: Permé, Caribbean slope; 21 November, 1929; H. Wedel.

Amazilia violiceps conjuncta Griscom

Amazilia violiceps conjuncta Griscom, Bull. Mus. Comp. Zoöl., **75**, 1934, p. 377.

Type. No. 224112, ad.♂; southern Sonora: Alamos; 16 February, 1888; M. Abbott Frazar.

† Hylocharis guianensis Boucard = Hylocharis sapphirina (Gmelin)

Hylocharis guianensis Boucard, Hummingbird, **1**, 1891, p. 52.

Cotype. No. 199592, ♂; British Guiana: Camacusa, 8 March, 1882; H. Whitely.

Trochilus sapphirinus Gmelin, Syst. Nat., **1**, pt. 1, 1788, p. 496.

One of Boucard's cotypes of this supposed species has already been listed by Bangs in his "Types of Birds now in the Museum of Comparative Zoölogy" (Bull. Mus. Comp. Zoöl., **70**, 1930, p. 219). The specimen here claimed as another cotype was in a small set of Guianan birds retained by T. E. Penard at the time he disposed of his main collection. The remaining birds were secured from Mrs. Penard after her husband's death.

In addition to Whitely's small, neat original label, the specimen bears Boucard's label with the words "typ specimen".

Thalurania colombica subtropicalis Griscom

Thalurania colombica subtropicalis Griscom, Bull. Mus. Comp. Zoöl., **72**, 9, 19 January, 1932, p. 337.

Type. No. 104142, ad.♂; Colombia: near Cali, Cauca Valley (5000 ft.); June, 1898; J. H. Batty.

† Thalurania colombica insulicola Griscom = Thalurania colombica columbica (Bourcier)

Thalurania colombica insulicola Griscom, Bull. Mus. Comp. Zoöl., **72**, 9, 19 January, 1932, p. 335.

Type. No. 106824, ad.♂; Colombia: San Miguel, Sierra Nevada de Santa Marta, (wrongly taken to be San Miguel, El Rey Island, Pearl Islands, Bay of Panama); 28 February, 1899; W. W. Brown.

Ornismya colombica Bourcier, Rev. Zool., 1843, p. 2.

When he spread out a very long series of *Thalurania colombica,* with a review of the forms in mind, Griscom mistook "San Miguel" on the labels of four of Brown's skins from the Santa Marta mountains, as meaning San Miguel in the Pearl Islands, where Brown also collected,

several years later, and noting the short tails of these skins described the form as an insular race.

Thalurania colombica has never been recorded from the Pearl Islands.

It is possible that the name *insulicola* may have to be used for the bird of the Santa Marta mountains which has a shorter tail than is found in Bogota "Trade Skins". [O.B.]

Lamprolaima rhami saturatior Griscom

Lamprolaima rhami saturatior Griscom, Proc. New England Zoöl. Club, **13**, 7 November, 1932, p. 58.

Type. No. 161003, ad. ♂; Honduras: District of Achaga, Cerro Cantoral, 6500 ft.; 13 February, 1932; C. F. Underwood.

Anthoscenus constantii surdus van Rossem

Anthoscenus constantii surdus van Rossem, Bull. Mus. Comp. Zoöl., **77**, 7, 29 December, 1934, p. 439.

Type. No. 224110, imm. ♀; Sonora: Alamos; 16 February, 1888; M. Abbott Frazar.

In the original description the sex is given as adult male; it is obviously an immature female, as is also indicated by the green tag placed on it by the collector (had it been a male a white tag would have been used); Brewster also wrote female on his collection label. No day of the month was given in the original description; the collection label shows it to have been the 13th, but 16th is put on the original green tag with a rubber date stamp, the impression is indistinct, but can readily be made out with a hand lens.

Lampornis amethystinus nobilis Griscom

Lampornis amethystinus nobilis Griscom, Proc. New England Zoöl. Club, **13**, 7 November, 1932; p. 58.

Type. No. 161004, ad. ♂; Honduras: District of Achaga, Montaña Vasquez, 6500 ft.; 16 December, 1931; C. F. Underwood.

Nesophlox evelynae salita Greenway
now Philodice evelynae salita (Greenway)

Nesophlox evelynae salita Greenway, Proc. New England Zoöl. Club, **15**, 28 October, 1936, p. 105.

Type. No. 171756, ad. ♂; South Caicos Island: Cockburn Harbor; 25 March, 1936; J. C. Greenway, Jr.

I do not see how it is possible to avoid sinking the generic name Nesophlox Ridgway 1910 in the synonymy of Philodice Mulsant, J. and E. Verreaux 1866. Ridgway apparently compared only with *Calliphlox amethystina* (Boddaert) the species that he referred to Nesophlox, but did not see *Trochilus mitchelli* Bourcier, which is the type of the genus Philodice. There seem to be no differences of generic value between *mitchelli* on the one hand, *Doricha bryantae* Lawrence and the Bahamian Woodstars on the other.

Atthis heloisa selasphoroides Griscom

Atthis heloisa selasphoroides Griscom, Proc. New England Zoöl. Club, **13**, 7 November, 1932, p. 58.

Type. No. 161005, ad. ♂; Honduras: District of Achaga, Cerro Cantoral, 6500 feet; 16 February, 1932; C. F. Underwood.

Stellula calliope lowei Griscom

Stellula calliope lowei Griscom, Bull. Mus. Comp. Zoöl., **75**, 1934, p. 380

Type. No. 163518, ad. ♂; Guerrero: Taxco; 25 October, 1930; W. W. Brown.

† Tilmatura dupontii xenoura Griscom
= Tilmatura dupontii (Lesson)

Tilmatura dupontii xenoura Griscom, Proc. New England Zoöl. Club, **13**, 7 November, 1932, p. 58.

Type. No. 161006, ad. ♂; Honduras: District of Achaga, Cerro Cantoral, 6500 feet; 24 February, 1932; C. F. Underwood.

Ornismya dupontii Lesson, Hist. Nat. Colibis, Suppl. Hist. Nat. Ois. Mouches, [1832], p. 100, pl. 1.

Berlioz (Ois. et Rev. Fran. d'Orn., 1938, p. 12–13) believes the characters upon which this form was founded to be too inconstant to permit its recognition.

TROGONIDAE

Pharomachrus pavoninus viridiceps Griscom and Greenway

Pharomachrus pavoninus viridiceps Griscom and Greenway, Bull. Mus. Comp. Zoöl., **81**, 2, May (=10 June), 1937, p. 426.

Type. No. 47852, ad. ♂; Brazil: lower Amazon River; C. M. Caverly.

Trogon mexicanus clarus Griscom

Trogon mexicanus clarus Griscom, Proc. New England Zoöl. Club, **13**, 7 November, 1932, p. 57.

Type. No. 224624, ad. ♀; Mexico: Chihuahua, Pinos Altos; 4 June, 1888; M. Abbott Frazar.

Trogon mexicanus lutescens Griscom

Trogon mexicanus lutescens Griscom, Proc. New England Zoöl. Club, **13**, 7 November, 1932, p. 56.

Type. No. 161002, ad. ♂; Honduras: District of Achaga, Cerro Cantoral, 6500 ft.; 16 December, 1931; C. F. Underwood.

Trogon elegans australis Griscom

Trogon elegans australis Griscom, Proc. New England Zoöl. Club, **12**, April, 1930, p. 3.

Type. No. 116576, ad. ♀; northeast Costa Rica: Bagaces; 14 November, 1895; C. F. Underwood.

CUCULIDAE

† Cuculus canorus maximus Neumann
= Cuculus canorus johanseni Tschusi

Cuculus canorus maximus Neumann, Anz. Orn, Ges. Bayern, **2**, 8, March, 1934, p. 332.

Type. No. 166945, ad. ♂; Siberia: East Sajan Mts., Argul River, Maralnik, 22 May, 1929; bought of Professor Oscar Neumann.

Cuculus canorus johanseni Tschusi, Orn. Jahrb., **21**, 1903, p. 165 (Tomsk Siberia).

The two other specimens mentioned by Neumann in his description of *maximus* are also in the Museum of Comparative Zoölogy; while referred to as cotypes and also marked as "cotypus", they are not entitled to such rank since a holotype exists. Were ornithologists concerned with paratypes, they could be claimed as such.

The alleged greater size of this proposed subspecies is not sufficient to distinguish it from *johanseni;* a conclusion also reached by Hartert and Steinbacher (Vog. pal. Fauna, Erganzungsb., Heft 4, 1935, p. 378–379).

†Piaya cayana incincta Griscom
=Piaya cayana thermophila Sclater

Piaya cayana incincta Griscom, Bull. Mus. Comp. Zoöl., **72**, 9, 19 January, 1932, p. 324.

Type. No. 155252, ad.♂; eastern Panama: Permé, Caribbean slope of Darien; 22 July, 1929; H. Wedel.

Piaya thermophila P. L. Sclater, Proc. Zool. Soc. London, 1859, p. 368 (Jalapa, Vera Cruz).

After examination of this race in connection with the 4th volume of my Check-List, I concluded that it was separated on characters too variable and inconstant, and consequently placed it in synonymy.

Geococcyx velox longisignum Moore

Geococcyx velox longisignum Moore, Trans. San Diego Soc. Nat. Hist., **7**, 31 May, 1934, p. 464.

Type. No. 161178, ad.♂; Honduras: Comayabuela; 1 October, 1931; C. F. Underwood.

CAPITONIDAE

Capito maculicoronatus melas Griscom

Capito maculicoronatus melas Griscom, Bull. Mus. Comp. Zoöl., **72**, 9, 19 January, 1932, p. 340.

Type. No. 155380, ad.♂; eastern Panama: Puerto Obaldia, Caribbean slope of Darien, 8 August, 1930; H. Wedel.

RAMPHASTIDAE

Ramphastos tucanus oblitus Griscom and Greenway

Ramphastos tucanus oblitus Griscom and Greenway, Bull. Mus. Comp. Zoöl., **81**, 2, May (=10 June), 1937, p. 427.

Type. No. 174070, ad.♂; Brazil: Rio Tapajóz; Tauary; 7 May, 1933; A. M. Olalla.

Pteroglossus aracari vergens Griscom and Greenway

Pteroglossus aracari vergens Griscom and Greenway, Bull. Mus. Comp. Zoöl., **81**, 2, May (=10 June), 1937, p. 431.

Type. No. 156885; ad.♂; Brazil: São Paulo, Valparaiso, 30 June, 1931; J. Lima.

Selenidera maculirostris hellmayri Griscom and Greenway

Selenidera maculirostris hellmayri Griscom and Greenway, Bull. Mus. Comp. Zoöl., **81**, 2, May (=10 June), 1937, p. 431.

Type. No. 174105, ad.♂; Brazil: Rio Tapajóz, Boim; 12 January, 1933; A. M. Olalla.

GALBULIDAE

Galbula leucogaster viridissima Griscom and Greenway

Galbula leucogaster viridissima Griscom and Greenway, Bull. Mus. Comp. Zoöl., **81**, 2, May (=10 June), 1937, p. 246.

Type. No. 173977, ad.♂; Brazil: Rio Tapajóz, Pinhy; 8 May, 1933; Olalla Brothers.

PICIDAE

Colaptes cafer nanus Griscom

Colaptes cafer nanus Griscom, Bull. Mus. Comp. Zoöl., **75**, 1934, p. 381.

Type. No. 98788, ad.♂; San Luis Potosí: Ipina; 30 November, 1924; W. W. Brown.

Chrysoptilus punctigula pallidior Griscom and Greenway

Chrysoptilus punctigula pallidior Griscom and Greenway, Bull. Mus. Comp. Zoöl., **81**, 2, May (=10 June), 1937, p. 431.

Type. No. 174228, ad.♂; Brazil: Lago Grande on the south bank of the Amazon west of the Tapajóz; 6 September, 1932; A. M. Olalla.

Dryobates villosus terraenovae Batchelder

Dryobates villosus terraenovae Batchelder, Proc. New England Zoöl. Club, **4**, 24 June, 1908, p. 37.

Type. No. 187418, ♂; Newfoundland: Placentia; 30 May, 1890; J. C. Cahoon.

Formerly no. 5227, collection of C. F. Batchelder.

† Dryobates pubescens oreoecus Batchelder
= Dryobates pubescens leucurus (Hartlaub)

Dryobates pubescens oreoecus Batchelder, Auk, **6**, 3, 1889, p. 253.

Type. No. 187517, ♂; New Mexico: Las Vegas Hot Springs; 18 December, 1882; C. F. Batchelder.

Picus leucurus Hartlaub, Naumannia, **2**, 1855, Heft 2, p. 55, (Rocky Mountains).

Formerly no. 196, collection of C. F. Batchelder.

This form was recognized in the 2nd ed. of the A.O.U. Check-List, but was replaced by the earlier *homorus* in the 3d which in turn was supplanted by *leucurus* in the 4th.

Yungipicus scintilliceps kurodai La Touche now Dryobates semicoronatus nagamichii (La Touche)

Yungipicus scintilliceps kurodai La Touche, A Handbook of the Birds of Eastern China, **2**, part 1, p. 22, May, 1931. Not *Dryobates leucotos kurodae* Götz.

Type. No. 132947 ad.♂; China: Fohkien Province, December, 1912; La Touche Collection.

Yungipicus scintilliceps nagamichii La Touche, Bull. Brit. Orn. Club, **43**, 31 October, 1932, p. 22. New name to replace *kurodai* La Touche, preoccupied.

Mesopicos griseocephalus persimilis Neumann

Mesopicos griseocephalus persimilis Neumann, Verh. Orn. Ges. Bayern, **20**, Heft 1, 1933, p. 227.

Type. No. 165841, ad.♂; Benguella: Bailunduland, Chipepe; 22 June, 1928; Paul Koester.

Cerchneipicus tinnunculus angustus Griscom and Greenway

Cerchneipicus tinnunculus angustus Griscom and Greenway, Bull. Mus. Comp. Zoöl., **81**, 2, May (=10 June), 1937, p. 432.

Type. No. 171161, ad.♂; Brazil: Para, Caxiricatuba on the right bank of the Tapajóz; 12 August, 1932; A. M. Olalla.

Ceophloeus lineatus obsoletus van Rossem

Ceophloeus lineatus obsoletus van Rossem, Trans. San Diego Soc. Nat. Hist., **8**, 4, 10 August, 1934, p. 12.

Type. No. 224294, ad.♂; Mexico: Sonora, Alamos; 16 March, 1888; M. A. Frazar.

Ceophloeus lineatus nuperus Peters

Ceophloeus lineatus nuperus Peters, Occ. Papers Boston Soc. Nat. Hist., **5**, 1930, p. 320.

Type. No. 105969, ad.♂; Colombia: Santa Marta Region, Concepción; 13 February, 1899; W. W. Brown.

FORMICARIIDAE

Dysithamnus puncticeps intensus Griscom

Dysithamnus puncticeps intensus Griscom, Bull. Mus. Comp. Zoöl., **72**, 9, 19 January, 1932, p. 343.

Type. No. 87219, ad. ♀; eastern Panama: Mount Sapo, Pacific slope of Darien; 23 April, 1922; Barbour, Brooks and Underwood.

FURNARIIDAE

Ancistrops strigilatus cognitus Griscom and Greenway

Ancistrops strigilatus cognitus Griscom and Greenway, Bull. Mus. Comp. Zoöl., **81**, 2, May (=10 June), 1937, p. 433.

Type. No. 174474, ad. ♂; Brazil: Pará, Tauary on the right bank of the Rio Tapajóz; 16 October, 1933; A. M. Olalla.

Philydor erythropterus diluvialis Griscom and Greenway

Philydor erythropterus diluvialis Griscom and Greenway, Bull. Mus. Comp. Zoöl., **81**, 2, May (=10 June), 1937, p. 433.

Type. No. 174480, ad. ♂; Brazil: Pará, Caxiricatuba, right bank of the Rio Tapajóz; 9 August, 1932; A. M. Olalla.

DENDROCOLAPTIDAE

Xiphorhynchus flavigaster ultimus Bangs and Griscom

Xiphorhynchus flavigaster ultimus Bangs and Griscom, Proc. New England Zoöl. Club, **13**, 7 November, 1932, p. 48.

Type. No. 147875, ad. ♂; Costa Rica: Nicoya, Ojo Ancha, 500 ft.; 2 November, 1929; Austin Paul Smith.

Xiphorhynchus erythropygius parvus Griscom

Xiphorhynchus erythropygius parvus Griscom, Auk, **54**, April, 1937, p. 196.

Type. No. 158227, ad. ♂; Honduras: Las Peñitas; 17 February, 1933; C. F. Underwood.

Campylorhamphus trochilirostris brevipennis Griscom

Campylorhamphus trochilirostris brevipennis Griscom, Bull. Mus. Comp. Zoöl., **72**, 9, 19 January, 1932, p. 348.

Type. No. 107335, ad. ♂; Panama: Lion Hill, Canal Zone; 7 March, 1900; W. W. Brown.

Nasica longirostris australis Griscom and Greenway

Nasica longirostris australis Griscom and Greenway, Bull. Mus. Comp. Zoöl., **81**, 2, May (=10 June), 1937, p. 432.

Type. No. 104401, ad. ♂; Brazil: Santarem; 2 October, 1882; Addison Brown.

TYRANNIDAE

Tyrannus vociferans xenopterum Griscom

Tyrannus vociferans xenopterum Griscom, Bull. Mus. Comp. Zoöl., **75**, 1934, p. 391.

Type. No. 163725, ad. ♂; Guerrero: Chilpancingo; 29 June, 1931; W. W. Brown.

Pitangus sulphuratus palliatus van Rossem

Pitangus sulfuratus (sic) *palliatus* van Rossem, Proc. Biol. Soc. Wash., **50**, 23 February, 1937, p. 25.

Type. No. 223617, ad. ♂; Mexico: Sonora, Alamos; 8 March, 1888; M. A. Frazar.

In the original description the number of the type was given as 222617, through a typographical error. Why Mr. van Rossem spelled the specific name of this bird as he did, and not *sulphuratus* as originally and universally spelled is unexplainable.

Empidonax fulvifrons inexpectatus Griscom

Empidonax fulvifrons inexpectatus Griscom, Proc. New England Zoöl. Club, **13**, 7 November, 1932, p. 60.

Type. No. 161007, ad. ♂; Honduras: District of Achaga, Cerro Cantoral, 6500 ft.; 9 December, 1931; C. F. Underwood.

Rhynchocyclus brevirostris hellmayri Griscom

Rhynchocyclus brevirostris hellmayri Griscom, Bull. Mus. Comp. Zoöl., **72**, 9, 19 January, 1932, p. 352.

Type. No. 140732, ad. ♂; Panama: Cana, Pacific slope of Darien; 6 August, 1928; R. R. Benson.

Todirostrum latirostre senectum Griscom and Greenway

Todirostrum latirostre senectum Griscom and Greenway, Bull. Mus. Comp. Zoöl., **81**, 2, May (=10 June), 1937, p. 434.

Type. No. 175819, ad. ♀; Brazil: Boca de Igarapé-Piaba, near Obidos; 6 March, 1933; A. M. Olalla.

Camptostoma pusillum major Griscom

Camptostoma pusillum major Griscom, Bull. Mus. Comp. Zoöl., **72**, 9, 19 January, 1932, p. 353.

Type. No. 104878, ad. ♂; Pearl Islands: San Miguel, El Rey Island; 4 May, 1900; W. W. Brown.

PIPRIDAE

Chloropipo holochlora suffusa Griscom

Chloropipo holochlora suffusa Griscom, Bull. Mus. Comp. Zoöl., **72**, 9, 19 January, 1932, p. 354.

Type. No. 155715, ad. ♂; eastern Panama: Obaldia, Caribbean slope; 31 July, 1930; H. Wedel.

COTINGIDAE

Pachyrhamphus cinnamomeus fulvidior Griscom

Pachyrhamphus cinnamomeus fulvidior Griscom, Bull. Mus. Comp. Zoöl., **72**, 9, 19 January, 1932, p. 357.

Type. No. 119889, ad. ♀; British Honduras: Toledo District; 22 October, 1906; Morton E. Peck.

Xipholena lamellipennis pallidior Griscom and Greenway

Xipholena lamellipennis pallidior Griscom and Greenway, Bull. Mus. Comp. Zoöl., **81**, 2, May (=10 June), 1937, p. 433.

Type. No. 175166, breeding ♀; Brazil: Rio Tapajóz, Santarem; 15 July, 1932; A. M. Olalla.

HIRUNDINIDAE

Psalidoprocne kösteri Neumann

Psalidoprocne kösteri Neumann, Verh. Orn. Ges. Bayern, **20**, Heft 1, 1933, p. 227.

Type. No. 165882, ♀; Benguella: Bailunduland, Chipepe; 17 June, 1928; Paul Koester.

The type and two other specimens from the same locality are obviously immature birds, lacking any trace of the characteristic "roughening" of the edge of the outer primary.

MUSCICAPIDAE

Dioptrornis brunneus bailunduensis Neumann

Dioptrornis brunneus bailunduensis Neumann, Orn. Monatsb., **37**, 6, November, 1929, p. 177.

Type. No. 165885; ♀, Benguella: Bailunduland, Chipepe, 1 June, 1928; Paul Koester.

† Muscicapa luteocephala Lafresnaye
= Neopelma aurifrons (Wied)

Muscicapa luteocephala Lafresnaye, Mag. Zool., **3**, 1833, cl. 2, pl. 13.

Type. No. 84376; Lafresnaye Collection no. 4666; Brazil.

Muscicapa aurifrons Wied, Beitr. Naturg. Bras., **3**, 1831, p. 829.

This specimen was identified many years ago by Outram Bangs as the type; he omitted it from his "List of Types in the Museum of Comparative Zoölogy" probably because Hellmayr (Cat. Bds. Am. pt. 6, 1929, p. 87) gave the location of the type as being in the Paris Museum.

There are several bits of evidence in the original description however, that point conclusively to the right of the Museum of Comparative Zoölogy specimen to rank as the type. In the first place, Lafresnaye gives no intimation that he had more than a single specimen at hand; second from a statement in the preface to the article in which he described this and three other species it seems clear that the studies were based on specimens in his own collection "Cette remarque m'ayant fait examiner plus attentivement les pieds des différentes espèces de l'ordre des Passereaux que je possède dans ma collection." Third, the colored plate accompanying the original description appears to have been drawn from the bird here claimed as the type; this specimen has not been relaxed, and is still in the form of a mount except that it has been removed from its stand and the legs straightened. The attitude of skin and plate agree exactly.

In describing *Muscicapa luteocephala* Lafresnaye gave it the same name as a bird described two years before by Lesson (Traité d'Orn, livr. 5, 1830 or 1831, p. 392), in fact tentatively assigned it to that species. Lesson's *M. luteocephala*, however, turns out to be a Heterocercus.

Muscicapula sapphirina laotiana Delacour and Greenway

Muscicapula sapphirina laotiana Delacour and Greenway, Bull. Brit. Orn. Club, **59**, 17 June, 1939, p. 132.

Type. No. 265099, imm. ♂; Laos: Col de Taloun, 25 km. east of Luang Prabang; 27 January, 1939; J. Delacour, J. C. Greenway, Jr. and F. Edmond-Blanc. Field no. 1945, VII Exped. en Indo-Chine.

Hypothymis azurea compilator Peters

Hypothymis azurea compilator Peters, Bull. Mus. Comp. Zoöl., **86**, 2, 27 November, 1939, p. 11.

Type. No. 194555, ♂; Philippine Islands: Basilan, 15 km. northeast of Maluso; 23 April, 1937; Barbara Lawrence.

Rhipidura teijsmanni sulaensis Neumann

Rhipidura teijsmanni sulaensis Neumann, Bull. Brit. Orn. Club, **59**, 21 April, 1939, p. 93.

Type. No. 269600, ad. ♂; Sula Islands: Taliabu, 11 October, 1938; J. J. Menden.

Myiagra azureicapilla azureicapilla Layard

Myiagra azureicapilla Layard, Ibis, 1875, p. 434.

Cotype. No. 166780, ad. ♂; Fiji Islands: Taviuni, Ngila; 18 August, 1875; E. L. Layard.

Cotype. No. 166781, ad. ♀; Fiji Islands: Taviuni, Ngila; 11 August, 1875; E. L. Layard.

This species was described by Layard who neither designated a type, nor stated the number of specimens that he had. The 4th volume of the Catalogue of Birds in the British Museum lists a male and female from Ngila, Taviuni, but does not claim either specimen as a type. A pair also went to Rowley who figured them in his "Ornithological Miscellany," **1**, pl. 35. The two specimens which I claim as cotypes are the two figured birds, bought at the Rowley auction in November, 1934 by Rosenberg, the London dealer, and from whom the museum obtained them.

Mathews makes this species the type of his monotypic genus Lophomyiagra, a genus that may have to be recognized eventually, but pending a general review of the Muscicapidae I make no change.

CAMPEPHAGIDAE

Edolisoma morio talautense Meyer and Wiglesworth

Edoliisoma talautense Meyer and Wiglesworth, Abh. Ber. K. Zool. Mus. Dresden, 1894–95 (1895), no. 9, p. 5.

Cotype. No. 97336, ad. ♂; Talaut Islands: Esang; 20 October, 1894; Charles W. Cursham's collectors. Received in exchange with the Dresden Museum. (No. C 13800).

Meyer and Wiglesworth described this form from fifteen specimens from the islands of Karkellang, Esang and Kabruang in the Talaut group; no holotype was designated. In their Birds of Celebes (**2**, 1898, p. 423) they list "ad.♀, type, Karkellang, Nov. 1894: Nat. Coll. — C 13795 and others" and "ad.♂, type, Kabruang, Nov. 1893 — C 13121, and others." As in the case of *Tanygnathus talautensis*, Meyer and Wiglesworth's action in the Birds of Celebes amounts to a subsequent selection of a male and female cotype, but I cannot see how it invalidates the right of any of the other original specimens to rank as cotypes.

Pericrocotus miniatus dammermani Neumann

Pericrocotus miniatus dammermani Neumann, Bull. Brit. Orn. Club, **57**, 30 June, 1937, p. 152.

Type. No. 177810, ♀; South Sumatra: Gunong Dempo, 2500 metres; 20 July, 1936; J. J. Menden.

No specimen identified by a museum number was designated in Professor Neumann's original description as the type; but his statement in the introduction to the description of this and three other subspecies of birds that the types are in the Museum of Comparative Zoölogy, coupled with the fact that the specimen is marked "typus" in its describer's handwriting and that the data correspond, definitely establishes its right to be the holotype.

TIMALIIDAE

Garrulax moniliger schauenseei Delacour and Greenway

Garrulax moniliger schauenseei Delacour and Greenway, Bull. Brit. Orn. Club, **59**, 17 June, 1939, p. 132.

Type. No. 265100, ♂; Laos: Xieng-Khouang, 1200 metres; 6 November (in original description), 6 December (on label), 1938; J. Delacour, J. C. Greenway, Jr., F. Edmond-Blanc. Field no. 76, VII Exped. en Indo-Chine.

Rhinocichla mitrata griswoldi Peters

Rhinocichla mitrata griswoldi Peters, Bull. Mus. Comp. Zoöl., **87**, 3, December, 1940, p. 204.

Type. No. 236020, ad., not sexed; Borneo: Mt. Tibang, 4000 feet; 19 November, 1925; Eric Mjöberg.

This specimen while not sexed is doubtless a male since it has a wing measurement of 109 mm., about the maximum for that sex. Wings of females run from 95.5 to 104.5.

Neocichla gutturalis angustus Friedmann

Neocichla gutturalis angustus Friedmann, Journ. Wash. Acad. Sci., **20**, 17, 1930, p. 434.

Type. No. 134447, ad. ♀; Tanganyika Territory: Muhalala, Kilamatindi; 3 March, 1922; Arthur Loveridge.

Turdinus rufipennis distans Friedmann now Illadopsis rufipennis distans (Friedmann)

Turdinus rufipennis distans Friedmann, Proc. New England Zoöl. Club, **10**, 14 April, 1928, p. 48.

Type. No. 237750, ♂; Tanganyika Territory: Amani, Usambara Mts.; 22 November, 1926; A. Loveridge.

The type was in the Museum of Comparative Zoölogy at the time that Outram Bangs published the list of types, but was accidentally omitted from his list.

This form is very distinct from the typical race; Friedmann discussed the differences between *distans* and allied forms with fairly good material available and his conclusions as to its relationship may be accepted.

Illadopsis stictigula pressa Bangs and Loveridge

Illadopsis stictigula pressa Bangs and Loveridge, Proc. New England Zoöl. Club, **12**, 1931, p. 94.

Type. No. 148499, ad. ♀; Tanganyika Territory: Nkuka Forest, Rungwe Mountains; 5 April, 1930; Arthur Loveridge.

Napothera epilepidota mendeni Neumann

Napothera epilepidota mendeni Neumann, Bull. Brit. Orn. Club, **57**, 30 June, 1937, p. 152.

Type. No. 177863, ♀; South Sumatra: Gunong Dempo, 1800 metres; 21 July, 1936; J. J. Menden.

No specimen identified by a museum number was designated as the type in Professor Neumann's original description, but his statement in the introduction to the paper in which this and three other subspecies of birds were named that the types are in the Museum of Comparative Zoölogy coupled with the fact that this was the only specimen of this form received and that the label is marked in Neumann's own hand "Typus von *Napothera epilepidota mendeni* Neum.", definitely establish this specimen as the holotype.

Alcippe ruficapilla danisi Delacour and Greenway

Alcippe (Fulvetta) ruficapilla danisi Delacour and Greenway, Proc. New England Zoöl. Club, **18**, 3 May, 1941, p. 47.

Type. No. 268092, ad. ♂; Laos: Xieng-Khouang; 15 December, 1938; J. Delacour and J. C. Greenway, Jr.

Stachyris striolata helenae Delacour and Greenway

Stachyris striolata helenae Delacour and Greenway, Bull. Brit. Orn. Club, **59**, 17 July, 1934, p. 130.

Type. No. 265102, ♂; western Laos: Nam-Khueng, 20 km. west of Ban-Houesai, Mekong River; 17 January, 1939; J. Delacour, J. C. Greenway, Jr. and F. Edmond-Blanc; Orig. no. 1724, VII Exped. en Indo-Chine.

Cyanoderma melanothorax mendeni Neumann
now Stachyris melanothorax mendeni (Neumann)

Cyanoderma melanothorax mendeni Neumann, Bull. Brit. Orn. Club, **55**, 30 April, 1935, p. 136.

Type. No. 170622, ♂; Java: east of Cheribon, Indromajoe; 17 December, 1929; J. J. Menden.

Bought of Professor Oscar Neumann.

Brachypteryx leucophrys langbianensis Delacour and Greenway

Brachypteryx leucophrys langbianensis Delacour and Greenway, Bull. Brit. Orn. Club, **59**, 17 June, 1939, p. 131.

Type. No. 265096, ad. ♂; Annam: Pic de Langbian, near Dalat; 13 March, 1939; J. Delacour and J. C. Greenway, Jr.; Field no. 2560, VII Exped. en Indo-Chine.

†Mesia argentauris galbana Mayr and Greenway
=Mesia argentauris vernayi Mayr and Greenway

Mesia argentauris galbana Mayr and Greenway, Proc. New England Zoöl. Club, **17**, 24 March, 1938, p. 3.

Type. No. 179993, ♂; Siam: Mt. Angka, 5700 feet; J. A. Griswold, Jr.

Mesia argentauris vernayi Mayr and Greenway, Proc. New England Zoöl. Club, **17**, 24 March, 1938, p. 3.

M. a. vernayi has line anteriority on the same page over *galbana*. Mr. Greenway tells me that more material proves that color and size differences which were supposed to have differentiated the populations of northern Siam and northern Burma fall within the range of individual variation.

TROGLODYTIDAE

Thryophilus leucopogon grisescens Griscom

Thryophilus leucopogon grisescens Griscom, Bull. Mus. Comp. Zoöl., **72**, 9, 19 January, 1932, p. 359.

Type. No. 155820, ad.♂; eastern Panama: Permé, Caribbean slope; 19 March, 1929; H. Wedel.

Thryophilus nigricapillus reditus Griscom

Thryophilus nigricapillus reditus Griscom, Bull. Mus. Comp. Zoöl., **72**, 9, 19 January, 1932, p. 358.

Type. No. 155797, ad.♂; eastern Panama: Permé, Caribbean slope, 31 August, 1929; H. Wedel.

Pheugopedius maculipectus microstictus Griscom

Pheugopedius maculipectus microstictus Griscom, Proc. New. England Zoöl. Club, **12**, April, 1930, p. 5.

Type. No. 48696, ad.♂; Tamaulipas: Santa Leonor; 9 March, 1909; F. B. Armstrong.

Pheugopedius maculipectus petersi Griscom

Pheugopedius maculipectus petersi Griscom, Proc. New England Zoöl. Club, **12**, April, 1930, p. 7.

Type. No. 136857, ad.♂; eastern Honduras: Lancetilla, 18 February, 1928; J. L. Peters.

Troglodytes brunneicollis compositus Griscom

Troglodytes brunneicollis compositus Griscom, Bull. Mus. Comp. Zoöl., **75**, 1934, p. 395.

Type. No. 48657, ad. ♂; Tamaulipas: Galindo; 25 March, 1909; F. B. Armstrong.

In his original description Griscom gave the catalogue number of this type as 49657; the actual number is the one given above.

Henicorhina leucophrys composita Griscom

Henicorhina leucophrys composita Griscom, Proc. New England Zoöl. Club, **13**, 7 November, 1932, p. 61.

Type. No. 161009, ad. ♂; Honduras: District of Achaga, Cerro Cantoral, 6500 feet; 13 December, 1931; C. F. Underwood.

MIMIDAE

Mimus gilvus clarus van Rossem

Mimus gilvus clarus van Rossem, Bull. Mus. Comp. Zoöl., **77**, 7, 29 December, 1934, p. 401. New name for *Mimus gilvus gracilis* of Authors, not Cabanis.

Type. No. 60596, ad. ♂; Quintana Roo: Camp Mengel; 19 March, 1912; J. L. Peters.

TURDIDAE

Turdus simensis kösteri Neumann

Turdus simensis kösteri Neumann, Orn. Monatsb., **37**, 6, November, 1929, p. 177.

Type. No. 165937, ad. ♂; Benguella: Bailunduland, Cassongue; 6 July, 1928; Paul Koester.

Neumann gives Chipepe as the place of capture, but on the collector's original label is written "Cassongue".

Merula migratoria achrustera Batchelder
now Turdus migratorius achrusterus (Batchelder)

Merula migratoria achrustera Batchelder, Proc. New England Zoöl. Club, **1**, 6 March, 1900, p. 104.

Type. No. 188205, ♂; North Carolina: Raleigh; 8 June, 1894; H. H. and C. S. Brimley.

Formerly no. 6433, collection of Charles F. Batchelder.

Turdus migratorius permixtus Griscom

Turdus migratorius permixtus Griscom, Bull. Mus. Comp. Zoöl., **75**, 1934, p. 396.

Type. No. 163992, ad. ♂; Guerrero: Chilpancingo, 8000 feet; 25 March, 1932; W. W. Brown.

Zoothera monticola atrata Delacour and Greenway

Zoothera monticola atrata Delacour and Greenway, Bull. Brit. Orn. Club, **59**, 17 June, 1939, p. 131.

Type. No. 265095, ad. ♀; Tonkin: Chapa, 5000 feet; 29 January, 1939; B. Bjorkegren.

Bessonornis albigularis porotoensis Bangs and Loveridge

Bessonornis albigularis porotoensis Bangs and Loveridge, Proc. New England Zoöl. Club, **12**, 1931, p. 94.

Type. No. 148659, ad. ♀; Tanganyika Territory: Igale, Poroto Mountains; 28 April, 1930; Arthur Loveridge.

Sheppardia cyornithopsis bangsi Friedmann

Sheppardia cyornithopsis bangsi Friedmann, Occ. Papers Boston Soc. Nat. Hist., **5**, p. 323, 1930.

Type. No. 134507, ad. ♂; Tanganyika Territory: Uluguru Mountains; 23 May, 1921; Arthur Loveridge.

Cossypha heuglini euronota Friedmann

Cossypha heuglini euronota Friedmann, Occ. Papers Boston Soc. Nat. Hist., **5**, 1930, p. 327.

Type. No. 134467, ad. ♀; Mozambique: Lumbo; 17 July, 1918; Arthur Loveridge.

Catharus melpomene bathoica Bangs and Griscom

Catharus melpomene bathoica Bangs and Griscom, Proc. New England Zoöl. Club, **13**, 7 November, 1932, p. 51.

Type. No. 147848, ♂; Costa Rica: Nicoya Peninsula, Ojo Ancho, 500 feet; 7 November, 1929; Austin Paul Smith.

SYLVIIDAE

Cisticola robusta omo Neumann and Lynes

Cisticola robusta omo Neumann and Lynes, Bull. Brit. Orn. Club, **48**, 16 July, 1928, p. 136.

Type. No. 160986, ad. ♂; Ethiopia: Jimma, Dobbi; 29 May, 1925; Professor Neumann and Dr. Heck.

On p. 654 of his Review of the Genus Cisticola, Admiral Lynes lists the type of this form as coming from "Kankati, Jimma Terr., southern Ethiopia".

Cisticola emini bailunduensis Neumann

Cisticola emini bailunduensis Neumann, Journ. f. Orn., 1931, p. 551.

Type. No. 166194, ad. ♀; Benguella: Bailunduland, Chipepe; 18 June, 1928; Paul Koester.

This is one of the specimens referred to by Lynes in the Ibis, 1930, Cisticola supplement, p. 314 as "e. *Cisticola emini* of Angola". On the bank of Professor Neumann's label Lynes has written: "compared with types of *emini* and conformed, 21 August, 1922. The only known specimen of its kind from Angola, and I will bet it came from one of those granitic kopje masses which are plentiful in the Bailundo-Huambo-Lepe country."

† Acrocephalus dumetorum gabrielae Neumann = Hippolais pallida pallida (Hemprich and Ehrenberg)

Acrocephalus dumetorum gabrielae Neumann, Verh. Orn. Ges. Bayern, **2**, Heft 2/3, 1934, p. 469.

Type. No. 166963, ad. ♂; Asia Minor: Elmali, westerly of Adalia; 20 May, 1933; Gabriele Neuhäuser.

Curruca pallida Hemprich and Ehrenberg, Symb. Phys., 1833, sig. bb.

Very shortly after describing this form Professor Neumann wrote me, "I committed the most terrible blunder of my whole ornithological life when I described *Acrocephalus dumetorum gabrielae* which is merely *Hippolais pallida*, or perhaps a slightly darker race of it."

Phylloscopus reguloides ticehursti Delacour and Greenway

Phylloscopus reguloides ticehursti Delacour and Greenway, Bull. Mus. Comp. Zoöl., **59**, 21 July, 1939, p. 151.

Type. No. 265098, ad. ♂; Annam: Langbian Peaks, 6000 feet; 4 March, 1939; J. C. Greenway, orig. no. 2355.

Apalis thoracica interjectiva Bangs and Loveridge

Apalis thoracica interjectiva Bangs and Loveridge, Proc. New England Zoöl. Club, **12**, 1931, p. 95.

Type. No. 148702, ad.♂; Tanganyika Territory: Kigogo, Uzungwe Mountains; 20 January, 1930; Arthur Loveridge.

Apalis eidos Peters and Loveridge

Apalis eidos Peters and Loveridge, Bull. Mus. Comp. Zoöl., **89**, 5, 24 February, 1942, p. 252.

Type. No. 270942, ad.♂, Belgian Congo: Lake Kivu, Idjwi Island; 28 February 1939; A. Loveridge.

Polioptila caerulea deppei van Rossem

Polioptila caerulea deppei van Rossem, Bull. Mus. Comp. Zoöl., **77**, 7, 29 December, 1934, p. 402. New name for *Polioptila caerulea mexicana* of Authors, not of Bonaparte.

Type. No. 113712, ad.♂; Yucatan: Rio Lagartos; 13 April, 1893; W. W. Brown.

Prinia hodgsonii confusa Deignan

Prinia hodgsonii confusa Deignan, Smiths. Misc. Coll., **103**, 1 September, 1942, **3**, p. 6.

Type. No. 129216, ad. ♂; Yunnan: Mengtse; 5 December, 1920; J. D. La Touche.

VIREONIDAE

Vireo hypochryseus nitidus van Rossem

Vireo hypochryseus nitudus van Rossem, Bull. Mus. Comp. Zoöl., **77**, 7, 29 December, 1934, p. 465.

Type. No. 221901, ad.♂; Sonora: Hacienda de San Rafael; 2 May, 1888; M. Abbott Frazar.

As has been shown by van Rossem, the Hacienda de San Rafael, while formerly in the State of Chihuahua, is now in the State of Sonora owing to relocation of boundary lines.

Vireo solitarius pinicolus van Rossem

Vireo solitarius pinicolus van Rossem, Bull. Mus. Comp. Zoöl., **77**, 7, 29 December, 1934, p. 467.

Type. No. 115724, ad.♂; Chihuahua: Mound Valley; 2 September, 1905; W. W. Brown.

BOMBYCILLIDAE

Ptilogonys cinereus pallescens Griscom

Ptilogonys cinereus pallescens Griscom, Bull. Mus. Comp. Zoöl., **75**, 1934, p. 398.

Type. No. 164037, ad. ♂; Guerrero: Chilpancingo, 8000 feet; 25 November, 1931; W. W. Brown.

LANIIDAE

Lanius schach sumatrae Neumann

Lanius schach sumatrae Neumann, Bull. Brit. Orn. Club, **57**, 30 June, 1937, p. 153.

Type. No. 178142, ad. ♂; South Sumatra: Gunong Dempu, 1800 metres; 28 July, 1936; J. J. Menden.

The type is in much worn plumage.

No specimen identified by number was designated as the type in Professor Neumann's original description, but his statement in the introduction to the paper in which he named this and three other subspecies of birds, that the types are in the Museum of Comparative Zoölogy, coupled with the facts that the data for the type correspond with those on the label of this specimen, and that Professor Neumann has written "Typus von *Lanius schach sumatrae* Neum." on the label obviously establish this specimen as the holotype.

Chlorophoneus abbotti sandgroundi Bangs

Chlorophoneus abbotti sandgroundi Bangs, Proc. New England Zoöl. Club, **12**, August, 1931, p. 70.

Type. No. 154820, ad. ♂; southern Rhodesia: Mount Silinda; 7 May, 1930; J. H. Sandground.

SITTIDAE

Sitta solangiae fortior Delacour and Greenway

Sitta solangiae fortior Delacour and Greenway, Bull. Brit. Orn. Club, **59**, 17 June, 1939, p. 133.

Type. No. 267097, ad. ♂; Annam: Pic de Langbian, near Dalat; 14 March, 1939; J. Delacour, J. C. Greenway, Jr. and F. Edmond-Blanc. Field no. 2602, VII Exped. en Indo-Chine.

CERTHIDAE

† Climacteris placens stevensi Greenway
= Climacteris placens meridionalis Hartert

Climacteris placens stevensi Greenway, Proc. New England Zoöl. Club, **14**, 25 January, 1934, p. 2.

Type. No. 167003, ad. ♂; Mandated Territory of New Guinea: Mt. Misim, 6800 feet; 20 January, 1933; Herbert Stevens.

Climacteris placens meridionalis Hartert, Bull. Brit. Orn. Club, **21**, 1907, p. 27.

This race is now placed in synonymy by Mayr in his recent "List of New Guinea Birds".

ZOSTEROPIDAE

Zosterops silvanus Peters and Loveridge

Zosterops silvanus Peters and Loveridge, Proc. Biol. Soc. Wash., **48**, 3 May, 1935, p. 77.

Type. No. 168994, ad. ♂; Kenya Colony: Taita, Mt. Mbololo, 4800 feet; 21 April, 1934; Arthur Loveridge.

The specific name of this bird is a latin masculine substantive signifying a woodland deity; there is no reason, therefore, to alter the termination to a feminine one to agree with the gender of the generic name although it is confidently expected that someone will make this blunder.

Zosterops virens sarmenticia Bangs and Loveridge

Zosterops virens sarmenticia Bangs and Loveridge, Proc. New England Zoöl. Club, **12**, 1931, p. 95.

Type. No. 148834, ad. ♂; Tanganyika Territory: Igale, Poroto Mountains; 25 April, 1930; Arthur Loveridge.

Zosterops minor tenuifrons Greenway

Zosterops minor tenuifrons Greenway, Proc. New England Zoöl. Club, **14**, 25 January, 1934, p. 3.

Type. No. 167005, ad. ♂; Mandated Territory of New Guinea: Morobe district, Wau, 3700 feet; 24 March, 1932; Herbert Stevens.

NECTARINIIDAE

Aethopyga gouldiae harrietae Delacour and Greenway

Aethopyga gouldiae harrietae Delacour and Greenway, Ois. Rev. Franç. d'Orn., **10**, 1940, p. 68.

Type. No. 269194, ♂; Laos: Phu-Kobo, near Xieng-Khouang; 12 December, 1938; J. Delacour, J. C. Greenway, Jr., F. Edmond-Blanc. Field no. 323, VII Exped. en Indo Chine.

Aethopyga ezrai blanci Delacour and Greenway

Aethopyga ezrai blanci Delacour and Greenway, Bull. Brit. Orn. Club, **59**, 17 June, 1939, p. 133.

Type. No. 265101, ♂; Laos: Phu-Kobo, 2000 metres, near Xieng-Khouang; 9 December, 1938; J. Delacour, J. C. Greenway, Jr. and F. Edmond-Blanc. Field no. 191, VII Exped. en Indo Chine.

Anthreptes orientalis barbouri Friedmann

Anthreptes orientalis barbouri Friedmann, Occ. Papers Boston Soc. Nat. Hist., **5**, 1931, p. 383.

Type. No. 134345, ad. ♀; Tanganyika Territory: Dodoma; 7 December, 1918; A. Loveridge.

MELIPHAGIDAE

Meliphaga gracilis stevensi Rand

Meliphaga gracilis stevensi Rand, Am. Mus. Novit., no. 872, July, 1936, p. 20.

Type. No. 168055, ♂; New Guinea: Morobé district, Biolowat, 2250 feet; 27 May, 1932; H. Stevens.

COMPSOTHLYPIDAE

Dendroica aestiva amnicola Batchelder

Dendroica aestiva amnicola Batchelder, Proc. New England Zoöl. Club, **6**, 6 February, 1918, p. 82.

Type. No. 188206, ♂; Newfoundland? Custlett; 14 June, 1890; John C. Cahoon.

Formerly no. 5360 Collection of Charles F. Batchelder.

Dendroica petechia armouri Greenway

Dendroica petechia armouri Greenway, Proc. New England Zoöl. Club, **13**, 26 April, 1933, p. 63.

Type. No. 157790, ♂; Old Providence Island; 13 March, 1933; James C. Greenway, Jr.

Dendroica plumbea guadeloupensis Brodkorb

Dendroica plumbea guadeloupensis Brodkorb, Proc. Biol. Soc. Washington, **44**, 1931, p. 3.

Type. No. 66508, ad. ♀; Lesser Antilles: Guadeloupe, Saint Claude; 26 June, 1914; G. K. Noble.

Chamaethlypis poliocephala ridgwayi Griscom

Chamaethlypis poliocephala ridgwayi Griscom, Proc. New England Zoöl. Club, **12**, April, 1930, p. 7.

Type. No. 118269, ad.♂; southwestern Costa Rica: Boruca; 10 June, 1906; C. F. Underwood.

Seiurus aurocapillus furvior Batchelder

Seiurus aurocapillus furvior Batchelder, Proc. New England Zoöl. Club, **6**, 6 February, 1918, p. 81.

Type. No. 188207, ♂; Newfoundland: near Deer Pond; 21 June, 1894; A. E. Colburn.

Formerly no. 6750 Collection of Charles F. Batchelder.

Granatellus sallaei griscomi van Rossem

Granatellus sallaei griscomi van Rossem, Bull. Mus. Comp. Zoöl., **77**, 7, 29 December, 1934, p. 403.

Type. No. 28916, ♂, presumably ad.; Guatemala: Coban, by designation. No original label.

The type is one from a collection of about 125 mounted birds from all parts of the world bought of H. A. Ward by Alexander Agassiz in the summer and fall of 1880 and by him presented to the Museum. Many of these specimens are still on exhibition in the synoptic gallery, but during the years that the late Outram Bangs was Curator of Birds, the rarer and more desirable species were withdrawn from exhibition, taken down and placed in the skin collection. The date when the specimen under discussion was added to the study collection is not known.

MOTACILLIDAE

Motacilla capensis simplicissima Neumann

Motacilla capensis simplicissima Neumann, Orn. Monatsb., **37**, 6, November, 1929, p. 176.

Type. No. 165971, ad. ♂; Benguella: Bailunduland, Chipepe; 25 June, 1928; Paul Koester.

Anthus australis exiguus Greenway

Anthus australis exiguus Greenway, Proc. New England Zoöl. Club, **14**, 1 February, 1935, p. 53.

Type. No. 168358, ad. ♂; northeastern New Guinea: Morobé district, Wau, 3500 feet; 22 April, 1932; Herbert Stevens.

ALAUDIDAE

Mirafra javanica aliena Greenway

Mirafra javanica aliena Greenway, Proc. New England Zoöl. Club, **14**, 1 February, 1935, p. 50.

Type. No. 168361, ad. ♀; northeastern New Guinea: Morobé district, Biolowat Camp, 2250 feet; 23 June, 1932; Herbert Stevens.

Eremophila alpestris aharonii Neumann

Eremophila alpestris aharonii Neumann, Anz. Orn. Ges. Bayern, **2**, 8 March, 1934, p. 333.

Type. No. 160990, ad. ♂; Syria: Ras Baalbek; 17 April, 1931; T. Aharoni.

FRINGILLIDAE

Pipilo fuscus texanus van Rossem

Pipilo fuscus texanus van Rossem, Trans. San Diego Soc. Nat. Hist., **7**, 34, 31 May, 1934, p. 371.

Type. No. 316022, (formerly 16025, Thayer Collection), ad. ♂; Texas: Kerrville; 24 April, 1910; F. B. Armstrong.

Colonel Thayer made a slight error in cataloguing six specimens of *Pipilo fuscus* all collected by Armstrong at Kerrville, Texas. Two of the Thayer birds bore his number 16025. The only specimen, however, which agrees with the date and sex of the type is listed in the catalogue under 16022, but none of the skins catalogued from 16020 and 16025

inclusive bear this number on their labels. The seventh specimen of the series was taken in Kerr County, Texas, 8 April, 1914, also by Armstrong.

Pipilo fuscus perpallidus van Rossem

Pipilo fuscus perpallidus van Rossem, Bull. Mus. Comp. Zoöl., **77**, 7, 29 December, 1934, p. 483.

Type. No. 222952; Chihuahua: Chihuahua; 30 November, 1888; M. Abbott Frazar.

Pipilo maculatus griseipygius van Rossem

Pipilo maculatus griseipygius van Rossem, Bull. Mus. Comp. Zoöl., **77**, 7, 29 December, 1934, p. 482.

Type. No. 222899, ad. ♂; Chihuahua: Jesus Maria; undated, but probably the autumn of 1884; R. R. McLeod.

Pipilo maculatus consobrinus Ridgway

Pipilo maculatus consobrinus Ridgway, Bull. Geol. and Geogr. Surv. Terr., **2**, 2, April, 1876, p. 189.

Cotype. No. 328590, ad. ♂; Lower California: Guadelupe Island; 20 February, 1875; Dr. Edward Palmer.

This specimen is one of the original series taken by Dr. Edward Palmer on which Ridgway based his description. Following the usual custom in such cases, I consider that all specimens of the type series should rank as cotypes. This bird was exchanged by the United States National Museum to Col. John E. Thayer several years ago; Col. Thayer had it mounted and placed on exhibition in his beautiful little private museum. Together with other mounted birds, this specimen came to the Museum of Comparative Zoölogy after Col. Thayer's death. It has been relaxed and is once more in the form of a skin.

Passerina leclancheri grandior Griscom

Passerina leclancheri grandior Griscom, Bull. Mus. Comp. Zoöl., **75**, 1934, p. 420.

Type. No. 238393, ad. ♂; Oaxaca: Chivela; 19 March, 1927; W. W. Brown.

Melozone rubricatum grisior van Rossem

Melozone rubricatum grisior van Rossem, Trans. San Diego Soc. Nat. Hist., **7**, 23, 31 March, 1933, p. 283.

Type. No. 222695, ad. ♂; Sonora: Hacienda de San Rafael; 11 May, 1888; M. Abbott Frazar.

At the time that Frazar collected at Hacienda de San Rafael, it was located in extreme western Chihuahua. Since then the Sonora-Chihuahua boundary has been relocated and it appears that the Hacienda now lies within the borders of the State of Sonora as mapped today. The relocation of political boundaries, reapportionment of countries among the great powers and the renaming of territories, while of absolutely no zoographical significance, bring about much confusion in correctly locating type localities of fifty years ago by present day maps.

Amphispiza bilineata confinis van Rossem

Amphispiza bilineata confinis van Rossem, Bull. Mus. Comp. Zoöl., **77**, 7, 29 December, 1934.

Type. No. 222576, ad.♂; Chihuahua: Chihuahua; 12 November, 1888; M. Abbott Frazar.

Xenospiza baileyi Bangs

Xenospiza baileyi Bangs, Proc. New England Zoöl. Club, **12**, 1931, p. 87.

Type. No. 45986, ad.♂; Jalisco: Bolaños; 8 March, 1889; (W. B. Richardson?).

I know of no instance that could possibly give better evidence of Outram Bangs' retentive memory for every bird skin that he ever handled than the circumstances that led to the naming of this bird. As he explained in the original description, the skin of the type had lain unnamed for many years in a "first series" tray. When he unpacked a finch that Alfred M. Bailey had recently collected in Mexico and forwarded to the M. C. Z. for identification, without saying a word Bangs went directly to the tray in question, selected the skin whose identity had been a mystery for so many years, compared it with Bailey's freshly collected specimen and lo, the two matched.

Aimophila quinquestriata septentrionalis van Rossem

Aimophila quinquestriata septentrionalis van Rossem, Bull. Mus. Comp. Zoöl., **77**, 7, 29 December, 1934, p. 485.

Type. No. 222625, ad.♂; "Chihuahua" (*i.e.* Sonora): Hacienda de San Rafael; 18 May, 1888; M. Abbott Frazar.

Aimophila humeralis asticta Griscom

Aimophila humeralis asticta Griscom, Bull. Mus. Comp. Zoöl., **75**, 1934, p. 417.

Type. No. 111800, ad.♂; Colima: Colima; 20 January, 1889; W. B. Richardson.

Aimophila rufescens antonensis van Rossem

Aimophila rufescens antonensis van Rossem, Trans. San Diego Soc. Nat. Hist., **9**, 36, 1 October, 1942, p. 436.

Type. No. 114601, ad. ♂; Sonora: La Chumata Mine, 4500 feet, Sierra de San Antonio; 23 May 1905; W. W. Brown.

The type locality is in north central Sonora; Brown collected there in May and June 1905 for the late John E. Thayer. Col. Thayer gave some of the birds to Outram Bangs and they became a part of the Museum of Comparative Zoölogy collection when the museum acquired the Bangs Collection.

Aimophila rufescens subvespera Griscom

Aimophila rufescens subvespera Griscom, Bull. Mus. Comp. Zoöl., **75**, 1934, p. 418.

Type. No. 164571, ad. ♀; Guerrero: Chilpancingo; 2 March, 1932; W. W. Brown.

Aimophila ruficeps simulans van Rossem

Aimophila ruficeps simulans van Rossen, Bull. Mus. Comp. Zoöl., **77**, 7, 29 December, 1934, p. 486.

Type. No. 222783, ad. ♂; Chihuahua: Mina Abundancia; 20 April 1888; M. Abbott Frazar.

Passerculus sandwichensis oblitus Peters and Griscom

Passerculus sandwichensis oblitus Peters and Griscom, Bull. Mus. Comp. Zoöl., **80**, 13, 19 January, 1938, p. 454.

Type. No. 172949 (formerly no. 23851 National Museum of Canada), ad. ♂; Manitoba: Churchill; 4 June, 1930; P. A. Taverner.

Passerculus sandwichensis crassus Peters and Griscom

Passerculus sandwichensis crassus Peters and Griscom, Bull. Mus. Comp. Zoöl., **80**, 13, 19 January, 1938, p. 459.

Type. No. 322033 (formerly no. 22033 J. E. Thayer Collection), ♂; Alaska: Sitka; 25 August, 1915; W. W. Brown.

† Loxia curvirostra turkestanensis Griscom
= Loxia curvirostra altaiensis Sushkin

Loxia curvirostra turkestanensis Griscom, Proc. Boston Soc. Nat. Hist., **41**, 5, 1937, p. 187.

Cotype. No. 98536, ♂; Turkestan: Semiretschie region, vicinity of Naryn, 10,000 feet; 26 December, 1915; V. Dacenko.

Cotype. No. 98537, ♀: Turkestan: Semiretschie region, vicinity of Naryn, 9000 feet; 4 December, 1915; V. Dacenko.

Loxia curvirostra altaiensis Sushkin, List and distr. Bds. Russian Altai, etc., Leningrad, 1925, p. 66. Ongudai, Central Altai.

Turkestanensis is a manuscript name of Sushkin's which he wrote on the labels of two specimens in his collection that were acquired from him by the Museum of Comparative Zoölogy. Griscom inadvertently validated this manuscript name in his "Monographic Study of the Red Crossbill", but there are certain discrepancies between his account and the actual data on the specimens here claimed as cotypes. Briefly, the facts are these: Griscom writes "A pair from the Sushkin Coll. are before me from Naryn, Russian Turkestan, collected December 26, 1915. They are labelled '*turkestanensis*' and this word has been crossed out and '*tianschanica*' has been added in another handwriting." Then follows diagnosis, measurements, and a statement that these specimens really represent *altaiensis*. It will be noted, however, that the male was the only one of the "pair" collected 26 December, the female having been taken three weeks previously. Moreover, while it is perfectly true that both birds are labelled '*turkestanensis*' in Sushkin's hand, that name has *not* been crossed out neither has '*tianschanica*' been added in another hand. At first I naturally supposed that the specimens referred to by Griscom must be in some collection other than that of the Museum of Comparative Zoölogy, but inquiry reveals that no specimens even approaching the data of the two Sushkin birds are to be found in any American Museum so the natural inference is that the statement about the erased name must be due to some confusion with other specimens.

Loxia curvirostra bangsi Griscom

Loxia curvirostra bangsi Griscom, Proc. Boston Soc. Nat. Hist., **41**, 5, 1937, p. 191.

Type. No. 142702, ♂ subadult; western Szechwan: Hadjaturgoo; 1 June, 1929; H. Stevens.

Loxia curvirostra mesamericana Griscom

Loxia curvirostra mesamericana Griscom, Proc. Boston Soc. Nat. Hist., **41**, 5, January, 1937, p. 136.

Type. No. 163123, ad. ♂; south-central Honduras: Rancho Quemado; 16 August, 1932; C. F. Underwood.

Loxia curvirostra neogaea Griscom

Loxia curvirostra neogaea Griscom, Proc. Boston Soc. Nat. Hist., **41**, 5, January, 1937, p. 110.

Type. No. 211094, ♂; Maine: Lake Umbagog; 9 February, 1886; L. Sargent.

The type is one of a series originally aggregating forty-three birds; all of them were shot the same day and sent to William Brewster who himself prepared and sexed the entire number. In his catalogue-journal Brewster writes: "They reached me in fairly good condition and I skinned and dissected every one of them. The Crossbills were *all* breeding and there was not the slightest difficulty in sexing them. In fact the sex mark in every case is *absolutely* reliable."

The type is not in fully adult plumage there being a certain admixture of yellow feathers on the chest, center of abdomen occiput and back. Brewster sexed the type as "♂" in distinction from some designated as "♂ ad." or "♂ yellow plumage".

I cannot help but feel that Griscom's renaming of the Red Crossbill of eastern North America was uncalled for. His chief basis for action was a photograph of the types of *Crucirostra minor* Brehm and *Loxia pusilla* Gloger, both in the Berlin Museum, published in Trans. San Diego Soc. Nat. Hist., 7, no. 30, 1934, to accompany an article by van Rossem on some types of North American birds in European museums. It had already been shown by Stresemann that Gloger's *pusilla* published in 1839 antedated Brehm's *minor* published in 1846 but he did not realize that two races were involved. van Rossem's examination of the types revealed the fact that in reality *pusilla* was one of the large-billed type of crossbill known as *Loxia curvirostra percna* Bent and that *minor* was a different subspecies. The photograph published was intended to show the difference in size of bill of the two specimens. While measurements of the large-billed form were given, none were appended of the small-billed bird; nevertheless Griscom referred this bird to the small northwestern race *sitkensis* Grinnell, influenced no doubt by van Rossem whom he quotes as saying "the provisional type of *minor* as illustrated by me is definitely and unquestionably the smallest billed bird of all". In as much as Griscom's

own measurements for *neogaea* are wing 86.5–91; culmen 15.5–17.5; depth of bill 9–10 and for *minor* (=*sitkensis*) wing 81.–88.5; culmen 13.5–15; depth of bill 8–8.8, it seems to me that the very slight mensural differences make it rash to attempt any switch of names on the basis of an unseen and unmeasured type.

If this view is shared by others then the name of the smaller of the eastern races of *Loxia curvirostra* will remain *minor* as in the 4th. edition of the A. O. U. Checklist and *neogaea* will fall as a synonym.

† Erythrina edwardsii rubicunda Greenway
= Erythrina edwardsii edwardsii Verreaux

Erythrina edwardsii rubicunda Greenway, Bull. Mus. Comp. Zoöl., **74**, 5, 20 February, 1933, p. 163.

Type. No. 159303, ad.♂; Tibet: Su-Wa-Tong, upper slopes of Mt. Kenichumpo or Gomba-La, east slope of the Salween-Irawaddy Divide at 14,000 feet; July, 1931; J. F. Rock.

Carpodacus edwardsii Verreaux, Nouv. Arch. Mus. **6**, 1870, Bull. p. 39.

Mr. Greenway believes that he mistook post mortem color change for geographical variation.

Erythrina vinacea rubidior Greenway

Erythrina vinacea rubidior Greenway, Bull. Mus. Comp. Zoöl., **74**, 5, 20 February, 1933, p. 164.

Type. No. 159258, ad.♂; Tibet: mountains of Tung-la, 12,000–14,000 feet; August, 1931; Joseph F. Rock.

Although not stated in the original description, the exact type locality is above Ho-fu-ping, on the west slope of the Pe-Ma-Shan, Yangtze-Mekong Divide.

Carpodacus argyrophrys Berlioz
now Erythrina pulcherrima argyrophrys (Berlioz)

Carpodacus argyrophrys Berlioz, Bull. du Museum (2) **1**, 1929, p. 131.

Type. No. 238546, ad.♂; Kansu: Mt. Lieuhoashan, (between Choni and Titao); 16 July, 1925; J. F. Rock.

At the time Berlioz described this form he wrote me saying that his name was based upon the series in the Museum of Comparative Zoölogy from Kansu, described at length by Peters and me (Bull. Mus. Comp. Zoöl., **68**, 1928, p. 374–375) and asked me to mark as type a good characteristic male. This I have done as above.

Stresemann (Orn. Mon. 38, 1930, p. 72–76) reviews this troublesome group of Rosy Finches, and, as it seems to me, reaches definite and final conclusions. [O.B.]

Linurgus kilimensis rungwensis Bangs and Loveridge

Linurgus kilimensis rungwensis Bangs and Loveridge, Proc. New England Zoöl. Club, **12**, 1931, p. 96.

Type. No. 148967, ad.♂; Tanganyika Territory: Nkuka Forest, Rungwe Mountains; 9 April, 1930; Arthur Loveridge.

Spinus notatus oleaceus Griscom

Spinus notatus oleaceus Griscom, Proc. New England Zoöl. Club, **13**, 7 November, 1932, p. 61.

Type. No. 161011, ad.♂; Honduras: District of Achaga, Cerro Cantoral, 6500 feet; 6 December, 1931; C. F. Underwood.

Saltator atriceps flavicrissus Griscom

Saltator atriceps flavicrissus Griscom, Auk, **54**, April, 1937, p. 198.

Type. No. 172345, breeding ♂; Guerrero: Isgusgilite; 15 May, 1936; W. W. Brown.

The locality is clearly written Isgusgilite in Brown's legible hand on the original label of the type and three other specimens of the series; on a fifth specimen it is written Isgusqilite and on the sixth bird "Esposcalete". Griscom in his description added a fourth variation,—Isguagilite.

Amaurospizopsis relictus Griscom

Amaurospizopsis relictus Griscom, Bull. Mus. Comp. Zoöl., **75**, 10 January, 1934, p. 412, fig. 1, p. 413, (generic details).

Type. No. 164702, ad.♂; Guerrero: mountains above Chilpancingo; 19 May, 1932; W. W. Brown.

I am not particularly impressed with the value of the generic characters relied upon to separate Amaurospizopsis from Amaurospiza, especially in view of the greater number of points of resemblance than of divergence; the large operculated nostril is common to both genera; there is no essential difference in the length or stiffness of the rictal bristles; the groove either side of the culmen and the faint ridges and grooves on the maxilla of Amaurospizopsis are indicated in some specimens of Amaurospiza; the shape of the bill is a matter of degree only;

Amaurospizopsis has a more rounded tail, a character not mentioned in the original diagnosis, but well shown in the drawing of the structural details.

† AMAUROSPIZOPSIS CONCOLOR Griscom
= AMAUROSPIZOPSIS RELICTUS Griscom

Amaurospizopsis concolor Griscom, Bull. Mus. Comp. Zoöl., **75**, 10, January, 1934, expl. to plate.

AMAUROSPIZA CONCOLOR AUSTRALIS Griscom

Amaurospiza concolor australis Griscom, Bull. Mus. Comp. Zoöl., **75**, 10, January, 1934, p. 415.

Type. No. 165751, imm. ♂; Panama: Pacific slope of Chiriqui, Boquete, 5100 feet; 20 November, 1931; Rex R. Benson.

In the original description Griscom gave the catalogue number as 164571, an obvious error, and the age of the type as adult. There are four birds from western Panama all taken by Benson, the data for each are as follows:

165751, imm. ♂, Chiriqui, Boquete, Quiel, 20 Nov. 1931, 5100 ft.
165752 ad. ♂, Chiriqui, Boquete, Cerro Punto, 16 Jan. 1932, 6200 ft.
165753 ad. ♂, Chiriqui, Boquete, Cerro Punto, 11 Jan. 1932, 6200 ft.
165754 ad. ♂, Chiriqui, Boquete, Cerro Punto, 6 Jan. 1932, 6100 ft.

Thus it will be seen that in spite of the scrambled number and erroneous age, number 165751 is the only specimen that corresponds with the data given for the type. Unfortunately at the time that Griscom was revising these finches he failed to attach a red label or otherwise indicate which specimen he actually intended to use as the type.

PHEUCTICUS CHRYSOPEPLUS DILUTUS van Rossem

Pheucticus chrysopeplus dilutus van Rossem, Bull. Mus. Comp. Zoöl., **77**, 7, 29 December, 1934, p. 479.

Type. No. 223067, ad. ♂; Chihuahua: La Trompa; 10 May, 1885; R. R. McLeod.

COEREBIDAE

DIGLOSSA BARITULA PARVA Griscom

Diglossa baritula parva Griscom, Proc. New England Zoöl. Club, **13**, 7 November, 1932, p. 61.

Type. No. 161010, ad. ♂; Honduras: District of Achaga, Rancho Quemado, 6700 feet; 5 April, 1932; C. F. Underwood.

THRAUPIDAE

† Ramphocelus dimidiatus albirostris Griscom
= Ramphocelus dimidiatus pallidirostris Hellmayr

Ramphocelus dimidiatus albirostris Griscom, Auk, **50**, 3, 10 July, 1933, p. 307.

Type. No. 108397, ad. ♂; Western Panama: Pacific slope of western Chiriqui, Divala; 13 November, 1900; W. W. Brown.

Tanagra albirostris Boddaert, Table Pl. enlum., 1783, p. 8, a synonym of *Ramphocelus carbo carbo* (Pallas).

Ramphocelus dimidiatus pallidirostris Hellmayr, Field Mus. Nat. Hist. Publ., Zool. Ser., **13**, pt. 9, 1936, p. 256.

New name for *R. d. albirostris* Griscom, preoccupied.

Piranga erythrocephala candida Griscom

Piranga erythrocephala candida Griscom, Bull. Mus. Comp. Zoöl., **75**, 10, Jan., 1934, p. 410.

Type. No. 222049, ad. ♂; Chihuahua (now Sonora): Hacienda de San Rafael; 15 May, 1888; M. Abbott Frazar.

Habia rubica hesterna Griscom and Greenway

Habia rubica hesterna Griscom and Greenway, Bull. Mus. Comp. Zoöl., **81**, 2, May (=10 June), 1937, p. 437.

Type. No. 176738, ad. ♂; Brazil: Pará, Patuna, on the right bank of the Rio Tapajóz; 26 June, 1933; A. M. Olalla.

Habia rubica holobrunnea Griscom

Habia rubica holobrunnea Griscom, Occ. Papers Boston Soc. Nat. Hist., **5**, 1930, p. 290.

Type. No. 233707, ad. ♂; Mexico: Vera Cruz, Montzorongo; 20 February, 1925; W. W. Brown.

Lanio leucothorax reversus Bangs and Griscom

Lanio leucothorax reversus Bangs and Griscom, Proc. New England Zoöl. Club, **13**, 7 November, 1932, p. 53.

Type. No. 147835; Costa Rica: Punta Arenas, Las Agujas; 9 October, 1929; Austin Paul Smith.

Tangara cayana littoralis Griscom and Greenway

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Type. No. 145451, ad. ♂; Surinam: near Paramaribo; 29 June, 1921; T. E. Penard.

ICTERIDAE

Molothrus bonariensis riparius Griscom and Greenway

Molothrus bonariensis riparius Griscom and Greenway, Bull. Mus. Comp. Zoöl., **81**, 2, May (=10 June), 1937, p. 434.

Type. No. 176543, ad. ♀; Brazil: Rio Tapajóz, Pinhy; 11 June, 1933; A. M. Olalla.

Sturnella magna subulata Griscom

Sturnella magna subulata Griscom, Bull. Mus. Comp. Zoöl., **75**, 10, Jan., 1934, p. 405.

Type. No. 109448, ad. ♂; Panama: Chiriqui (Pacific slope), Boquete, 4000 feet; 30 January, 1901; W. W. Brown.

† Icterus gualanensis Underwood
= Icterus chrysater chrysater (Lesson)

Icterus gualanensis Underwood, Bull. Brit. Orn. Club, no. 55, 1898, p. 59.

Cotype. No. 113872, ♂; Guatemala: Gualan; 4 August, 1897; C. F. Underwood.

Cotype. No. 113873, ♀; Guatemala: Gualan; 11 July, 1897; C. F. Underwood.

Xanthornus chrysater Lesson, Compl. Oeuvr. Buffon, **7**, 1847, p. 332.

The two skins listed above were not recognized as "types" until Griscom found them to be such while at work on the Dwight collection of Guatemala birds. They were in Underwood's private collection of birds when that was purchased by Col. John E. Thayer, and presented to me, to come later to the Museum of Comparative Zoölogy. There may be other cotypes but I doubt it. [O.B.]

Icterus sclateri flammulatus Griscom

Icterus selateri flammulatus Griscom, Proc. New England Zoöl. Club, **13**, 7 November, 1931, p. 62.

Type. No. 161012, ad. ♂; Honduras: Monte Redondo; 15 December, 1931; C. F. Underwood.

Icterus pustulatus microstictus Griscom

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Type. No. 114624, ad. ♂; Sonora: Guaymas; 22 February, 1905; W. W. Brown.

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Scissirostrum dubium pelingense Neumann

Scissirostrum dubium pelingense Neumann, Bull. Brit. Orn. Club, **59**, 21 Jan., 1939, p. 47.

Type. No. 270501, ♂; Peling Island; 17 July, 1938; J. J. Menden.

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Parotia lawesi fuscior Greenway

Parotia lawesi fuscior Greenway, Proc. New England Zoöl. Club, **14**, 25 Jan., 1934, p. 2.

Type. No. 167002, ad. ♀; Mandated Territory of New Guinea: Mt. Misim, 6400 feet; 19 December, 1933; Herbert Stevens.

Lophorina superba sphinx Neumann

Lophorina superba sphinx Neumann, Orn. Monatsb., **40**, 1932, p. 121.

Type. No. 153639, ad. ♀ or yg. ♂; New Guinea, exact locality not known. Bought from Professor Oscar Neumann.

Paradisea rudolphi ampla Greenway

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Type. No. 167001, ad. ♂; Mandated Territory of New Guinea: Mt. Misim, 5700 feet; 5 April, 1933; Herbert Stevens.

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Crypsirina varians longipennis Neumann

Crypsirina varians longipennis Neumann, Bull. Brit. Orn. Club, **55**, 30 April, 1935, p. 136.

Type. No. 170621, ♀; Siam: Chantaboon; 21 February, 1930; C. J. Aagaard. Purchased from Professor Oscar Neumann.

Aphelocoma californica remota Griscom

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Type. No. 163815, ad. ♀; Guerrero: Chilpancingo; 27 October, 1931; W. W. Brown.

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Type. No. 115266, ad. ♀; Yucatan: Rio Lagartos; 1 June, 1893; W. W. Brown.

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A REVISION OF NEARCTIC NITIDULIDAE (COLEOPTERA)

By Carl T. Parsons

With Thirteen Plates

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INTRODUCTION

During the discreet years of the 1870's, the stork almost invariably arrived at night. This happy phenomenon enabled a Philadelphian obstetrician, Dr. George Horn, to devote his daylight hours to entomology and his evenings to his profession. Dr. Horn not only wrote but printed his entomological papers. The Doctor's type-setting was as painstaking as his discrimination in entomology, and these combined talents led to the appearance in 1879 of an extremely careful review of a family of rather shiny clavicorn beetles appropriately called Nitidulidæ. Since that time the family has been so neglected that the succeeding sixty years have placed our knowledge of the group seriously in arrears. The present paper attempts to atone for this neglect.

Acknowledgements. This work was carried out under Prof. C. T. Brues, to whom the writer is indebted for infinite patience and constructive advice. To other members of the staff of the Museum of Comparative Zoölogy, Prof. F. M. Carpenter, Dr. P. J. Darlington, Jr.,

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and Prof. Nathan Banks, the writer is also deeply obligated. Too numerous to mention by name are the curators and collectors in this country and Europe, who have permitted the writer unlimited access to the collections in their charge and even dissection of valuable specimens when necessary.

Sources of material. This paper is so much the result of a synthesis of material that it is difficult to single out particular sources for mention here. Certainly the Museum of Comparative Zoölogy contained the most indispensable collection. Here were the types of Leconte, Horn (several holotypes and cotypes of all but three species), Melsheimer, Fall, Crotch, some of Casey, cotypes of Mäklin and Mannerheim, and paratypes of Schaeffer and the author. The United States National Museum contains some of Schaeffer's types, Wickham's type, and a very large and nearly complete series with excellent data. At the Philadelphia Academy of Sciences the writer examined the valuable but obsolete Horn collection. Much critical material was seen at the British Museum (Murray's types and the complete set of Middle American species), Berlin Museum (Erichson's types), the Carnegie Museum (Hamilton and Ulke's types), California Academy of Natural Sciences, American Museum of Natural History, and numerous public and private collections. Also the writer's collection was of great value, because it contained the Leng (Nearctic), Em. Reitter (Palaearctic) collections, specimens compared with most of the other types, is world-wide in scope, and supplied almost all of the material for dissection.

Historical. Linnæus, in 1758, was the first to describe some cosmopolitan nitidulids which have since been found to occur in North America. He placed them in *Dermestes* under the silphids. Then Fabricius, 1775-1798, described from the West Indies the first American species. Fabricius placed his species in *Nitidula*. Latreille, Herbst, Kugellan, Stephens, Shuckard, broke up the genus and added new genera. To them we owe the genera *Cateretes* Herbst (*Cereus* Latreille), *Brachypterus* Kugellan, *Carpophilus* Stephens, *Meligethes* Stephens, *Cychramus* Kugellan, *Cryptarcha* Shuckard, as well as several exotic ones.

But it was not until 1843 that the family underwent a critical examination. In that year Erichson published the most important work ever written on the family, his "Versuch einer systematischen Eintheilung der Nitidularien." The main divisions (now subfamilies) laid down by Erichson are followed almost exactly in the present work. Erichson described in a most complete and accurate manner a large number of genera ("coupes"), of which *Colastus, Brachypeplus, Cono-*

telus, Epuraea, Soronia, Prometopia, Amphotis, Lobiopa, Omosita, Phenolia, Stelidota, Thalycra, Pocadius, Camptodes, Cyllodes, Amphicrossus, Pallodes, Oxycnemus, occur in the Nearctic region. In the same work Erichson described a number of species from eastern United States.

Following Erichson, Leconte added two genera and a large number of species. In 1879 Horn published his careful "Revision of the Nitidulidæ of the United States," describing two new genera and several species. Since Horn, there have been only scattered descriptions, except for the revision of one genus (*Glischrochilus*) by Brown in 1932.

Erichson (1843, 1844) included *Rhizophagus, Cybocephalus,* and *Ostomatidæ* in the family. Horn, 1879, likewise included *Rhizophagus, Cybocephalus,* and also *Smicrips* (now placed in the *Cucujidæ*) but excluded the Ostomatidæ. Grouvelle, 1913, excluded *Rhizophagus* which has since constituted a separate family. Murray, 1864, and recently Peyerimhoff, 1933, Böving and Craighead, 1931, have excluded *Cybocephalus* to form a separate family. The present writer concurs in this arrangement. The relationships of the Nitidulidæ with its nearest relatives, Rhizophagidæ and Cybocephalidæ, are given under "Morphology" (p. 129).

The subfamilies here treated as the Cateretinae and Meligethinae have been made a separate family (Brachypteridæ) by Verhoeff, 1928, on the basis of larval characters. Since the larvæ of many aberrant genera are still unknown, it is premature to make new families. The writer believes that the classification within a family can often be made to show the anomalous character of a subfamily without creating a new family. As for the Nitidulidæ the present subfamilies are on the whole so nebulous that they could easily be made tribes under the Nitidulinæ, which would then rank equally with the Cateretinæ and Meligethinæ.

Nomenclatorial Units

On the origin of species and genera in the Nitidulidæ. The basic unit used in naming the groups of individuals is the species. Unfortunately, due to lack of sufficient material, the term species is sometimes used to define a rather vague and sometimes highly variable syngamium.

Most of the species seem to be monotypic (Rensch's *Ar*), that is to say are not differentiated into subspecies. In many cases the affinities between monotypic species are clear, and in such cases the relationships are indicated by comparisons which appear after the descriptions. Since no intergradations are apparent, these species are thought of as monotypic.

Polytypic species (Rensch's *Formenkreis*) are species which are differentiated into two or more subspecies. Again due to lack of material, the few forms that appear to be subspecies are treated as species even though intergradations are evident. In some other cases, variations which may well be of subspecific value are lumped under one species.

The writer believes that, in a work of this kind, the only key to the origin of species lies in a study of the polytypic species. Among the terrestrial vertebrates and many invertebrates (such as Carabidae and Molluscs) Huxley, Rensch, and others believe that the most important manner of originating new species is by the formation of geographical subspecies. As for the Nitidulidae, the writer believes from the sketchy evidence that the geographical splitting up of species is less important than ecological separation of species. A good example is *Carpophilus melanopterus* and *rufus*. Heretofore, *rufus* has been thought to be either synonymous with or a mere color variety of *melanopterus*. But it was found that *melanopterus* is restricted to *Yucca* blossoms, whereas *rufus* is found on flowers of cacti. The ranges of the two forms overlap, but because of the distinct ecology, constant color differences, and slight sculptural tendencies to vary, the forms are considered distinct species.

There are some cases whereby special isolation has been enough to make new species. In North America the most important factor limiting distribution is the lack of rainfall in the Great Plains region. Although many species are found from Quebec to Florida, the western limit of their range is, in almost every case, along the ninety-seventh parallel. Some species, however, extend from coast to coast across Canada and then range southward in the east and in the Rocky Mountains. In that way *Perthalycra* may have become split into an eastern and western species.

Oceans, of course, are more definite barriers to distribution. Thus we find *Thalycra* with a species in Europe and another in Michigan. The cosmopolitan and even Holarctic species are clearly distributed by man.

Another possible method of species formation is hybridization, a method seldom discussed with respect to insects. Since botanists and vertebrate zoologists often mention hybrids without experimental evidence, there seems to be no reason why entomologists cannot do likewise. Among the nitidulids, *Carpophilus sayi* and *lugubris* evidently hybridize along a region extending from Virginia to Illinois. The intermediate form has distinctive facies and may well be an incipient species. In *Oxycnemus* there are two species which are occa-

sionally found together in the same fungus yet retain constant and distinctive structural and color differences. Very rarely occur two forms of apparent hybrids. Both of these forms have characters which belong to one or the other of the parent species or are intermediate. Significantly one of the forms is much larger than either of the parent species, a characteristic often found in hybrids of other animals and plants.

Thus in writing this paper at least three methods of speciation became evident. The method of hybridization, although hypothetical, is clearly indicated and could be tested experimentally. Of the other two, the occupation of a new habitat seems to be a more important method of speciation than geographical isolation. Just how it takes place would be a most pertinent problem for investigation.

The geographical subgenus or genus (Rensch's *Artenkreis*) is a group of related forms clearly meriting specific rank, but showing geographical replacement to a degree which makes it certain they have arisen by geographical differentiation. Huxley wrote the above definition having in mind mainly vertebrates and molluscs. The Nitidulidae (and also insects in general) offer evidence that the definition should be extended to include ecological and biological replacement, as well as geographical. Many a morphologically aberrant species is found to differ ecologically from its congeners. For example, the most distinctive species of Nearctic *Epuraea* is *monogama*. This species occurs in the fungus *Polyporus volvatus*, whereas the others are found under bark, at flowers, etc. An example of geographical replacement would be the Nearctic *Cateretes* of the subgenus *Pulion*, which differs from the Palaearctic species in the subgenus in one character of generic importance, namely, the eighth abdominal segment visible in the male. Both the *Epuraea* and the *Cateretes* seem to the writer to be incipient genera.

True genera which appear to have arisen by geographical replacement would be *Boreades* (annectant between the Neotropical *Cercometes* and the Palaearctic *Heterhelus*) and both *Perthalycra* and *Quadrifrons* (probably from the Holarctic *Thalycra*). Also *Phenolia* is an eastern Nearctic derivative of the cosmopolitan *Soronia*. Significantly these are the only endemic Nearctic genera (except *Anthonaeus*, *Orthopeplus*, mentioned below). The other genera are too widely distributed to hazard a guess as to their geographical origin.

On the other hand, so many of the genera have such distinctive habits that they may have originated by ecological replacement. For instance, of the endemic genera, *Anthonaeus* is a depressed *Amartus* modified for flowers of *Agave*, and *Orthopeplus* is an *Epuraea* evidently

adapted for living in tunnels. *Pocadius*, *Cychramus*, *Cyllodes*, and *Oxycnemus* are four rather closely related genera each of which is restricted to a different genus of fungus. Many more examples could be given of genera that are ecologically distinct.

Since the most anomalous species of a genus is often also ecologically aberrant, and since the genera are mostly very widespread, with overlapping ranges, yet ecologically distinct, the writer believes that nitidulid genera arose chiefly by the assumption of a new habitat by a species.

When the new genus (or subgenus) comes into existence by occupying a new habitat, the environmental pressure would, in many cases, be suddenly relaxed. This relief of competition would mean that the pressure of natural selection is also lessened. Thus many mutations that would be lethal in the old habitat would be viable in the new one. But once the new habitat is thoroughly occupied, the pressure of natural selection would again be so strengthened that the evolution of new forms would be greatly impeded or even halted. One would then expect to find the nitidulids split up into a large number of distinct genera, each in a separate ecological sphere and each embracing very few species. And such is the case, for there are about one-fourth as many genera as species of Nearctic Nitidulidae. The proportion of genera to species would be very much higher if it were not for two large genera which have succeeded in occupying a variety of habitats. The genera of the future may be expected to come from the still actively evolving species of these genera. The two genera are *Carpophilus* (29 species) and *Epuraea* (29 species). As one would expect, the discrimination of species is most difficult here.

The genus is generally considered to be an artificial and arbitrary unit of classification, but the writer believes that it need not be. When examined in the above manner, the geographical or ecological genus appears to be a natural taxonomic unit. Certainly, it is necessary to know well not only the complete morphology but the biology of each species (and its forms) before a natural classification can be wrought. Unhappily our knowledge of the Nitidulidae permits only an approximation to such perfection.

Evolution and the relative value of morphological characters in the family

Clues to how the family is evolving may be found by examining the characters used in taxonomy. The more carefully the taxonomic work has been done, the greater are the number of available clues. The subfamily characters are mainly highly tenuous and of only generic magnitude. The subfamily does seem to be valuable, however, in indicating the evolutionary trends evinced by groups of genera. The

Cateretinae is the most primitive and discrete subfamily, whereas the Cryptarchinae is the most derivative, if more nebulous, unit.

The characters of value in defining genera are many and usually very definite. Interestingly, they are almost entirely different from specific characters. The specific characters have to do with variations in sculpture, pubescence, and color. Color is a highly unreliable criterion. Whereas variations in sculpture are sometimes present but then only within definite limits diagnostic for each species. For instance, as the figures show, the profile of the prosternum in *Pocadius* is variable but only within specific limits. Individuals of *Pocadius* vary sculpturally only in this manner. The differences can hardly have a selective value. Evidently, such variation seems to be an external, phenotypic manifestation of the genetic mutations which have differentiated the species of *Pocadius*.

Zoogeography

A perusal of Table I will show the preponderance of the Nitidulinae over the other subfamilies. One would assume that this is the most successful, if it were not heterogeneous and probably in need of being partitioned into several subfamilies. At present, evolution seems to be in progress in all of the subfamilies, because, of the Nearctic genera, there is at least one genus in each subfamily in which speciation is now active.

Table I

Subfamilies	No. of genera	%	No. of species	%
Cateretinae	6	15	11	7
Carpophilinae	4	12	40	27
Nitidulinae	21	62	76	50
Meligethinae	1	3	5	3
Cryptarchinae	3	8	20	13
Total	35	100	152	100

An examination of Table II offers clues to the history and origins of the Nearctic genera. In the first place, most of the genera must be ancient (of early tertiary or even Cretaceous origin) since more than half are cosmopolitan or nearly so. Where these widespread genera started cannot be conjectured. About an equal number of genera are Holarctic or American in distribution. The Holarctic genera, except for *Brachypterolus*, seem to have arrived in North America from Siberia. The New World and two of the tropicopolitan genera appear to be relatively recent arrivals from the tropics into the United States. Six genera are endemic to North America.

Thus a surprisingly small proportion of the Nearctic fauna is autochthonous. Evidently the bulk of the present fauna immigrated several times during the Tertiary period.

Table II

Genera of Nearctic Nitidulidae	Cosmopolitan	Holarctic	New World	Nearctic
Cateretes		+		
Boreades				+
Brachypterus	+ [1]			
Brachypterolus		+		
Amartus		+		
Anthonaeus				+
Conotelus			+	
Brachypeplus	tropicopolitan			
Colopterus			+	
Carpophilus	+			
Haptoncus	tropicopolitan, also			subtropics
Epuraea	+			
Orthopeplus				+
Stelidota	+			
Omosita	+			
Nitidula	+ [1]			
Prometopia	tropicopolitan, also			+
Lobiopa			+	
Soronia	+			
Phenolia				+
Amphotis		+		
Thalycra		+		
Perthalycra				+
Quadrifrons				+
Pocadius	+ except Australian			
Camptodes			tropics	
Amphicrossus	tropicopolitan, also			+
Cychramus	+ except Ethiopian			
Pallodes	+			
Cyllodes	+			
Oxycnemus	+ except Ethiopian and Austr.			
Meligethes	+ except Neotropical			
Cryptarcha	+			
Pityophagus		+		
Glischrochilus	+ except Ethiopian			

[1] = neither Australian nor Oriental.

Biology

The habits of the Nitidulidae are remarkably variable. In the most primitive subfamily (Cateretinae) the larvae live in the seed capsules of various plants and the adults feed on the pollen and petals of the same plants or sometimes of others. The members of the other subfamilies are primarily saprophagous and mycetophagous. Although some live in flowers, the majority live in decaying fruits, fermenting plant juices, and in fungi. Some genera live in a particular fungus peculiar to that genus. *Epuraea depressa,* according to Dodge, breeds in the nests of bumblebees, and the larvae are considered fungivorous. Cockerell has collected *Epuraea integra* in the nest of *Bombus juxtus.* This habit is similar to the Australian *Brachypeplus auritus* of which the larvae and adult feed on the wax and honey of a wild bee. *Amphotis* occurs in ant nests; *ulkei* is strictly myrmecophilous in the early spring but in the fall of the year is found in decaying fungi. *Nitidula* and *Omosita* breed in carrion. In Europe the larvae of certain *Glischrochilus, Nitidula,* and *Pityophagus* are predaceous on Scolytids and may have similar habits in the United States.

In temperate regions most of the species hibernate beneath logs. Pupation takes place in the earth, which indicates that the pupae may hibernate also. In the tropics the life cycle seems to be continuous, although there must be aestivation over extremely dry seasons.

Morphology

The antennae are eleven-segmented. The three-segmented club is variable; it may be hardly noticeable, as in *Cateretes,* or compactly circular as in *Camptodes.* In the Rhizophagidae the ten-segmented antennae have a two-segmented club. Among the Nitidulidae a tendency to this reduction is evinced in the Oriental *Chalonecrus wallaeei.*

Many genera have a pair of narrow grooves on the under side of the head, on each side, for the reception of the basal portions of the antennae. These extend backward obliquely or parallel with each other. The presence or absence of the grooves is a useful generic character, but the degree of convergence is of doubtful value.

The mandibles are rather broad, with a brush of hairs on the inner margin, often bidentate at the apex, the inner tooth often being smaller and shorter than the outer. They may be unequal in length, as in the males of *Cryptarcha.* Also only one may be bidentate, or there may be a number of small teeth behind the apex.

The maxillae are bilobed (galea present) in the Cateretinae but with a single lobe (lacinia) among the remaining groups. The galea is always slender and never has more than a few hairs at tip. In some *Brachypterus* and *Amartus*, at least, there is a small vesicle at or near the extremity, which may have some gustatory function. The lacinia is rather narrow in the Cateretinae but broader in the other groups, with a brush of hairs at the extremity and often on the inner margin. The relative sizes and shape of the laciniae and palpi are useful in indicating generic affinities.

The ligulae are rather variable in shape. The three-segmented labial palpi are inserted on a distinct palpiger on the ventral side of the ligula. Placed more or less dorsally on the anterior and lateral margins of the ligula are the pair of paraglossae, which may be large and horn-shaped, reduced, or absent. The palpi in particular offer good characters for generic differentiation.

The mentum is usually trapezoidal, bisinuate in front, and rather invariable, consequently not very useful for generic differences. The mentum of *Amphotis*, however, shows specific differentiation.

The labrum is transverse, and usually more or less bilobed. It is exposed, except in *Meligethes* where it is concealed by the clypeus. The labrum is articulated by a pair of slender struts produced posteriorly from each posterior angle and also by a short, median, triangular projection.

The clypeus is distinct in some of the Cateretinae but is usually indistinguishable from the front.

The eyes are lateral, rounded, and large. The degree of coarseness of the facets varies generically in the Nitidulinae.

The prothorax is highly variable in form but there is a general tendency for the lateral margin to be explanate. The prosternum is produced posteriorly into a lamellate process which extends between the coxae and sometimes overlaps the mesosternum. The anterior coxal cavities are obtuse at the proximal end and terminate in a point directed obliquely antero-laterally. The anterior cavities are open behind only in the Cateretinae.

The mesothorax is short; the episternum large with a narrow epimeron along its outer margin. The scutellum is usually triangular, but it may be pentagonal, semicircular, or quadrangular. The sternum is sometimes carinate and the coxal cavities are closed and strongly transverse. The elytra tend to be shortened but often only part of the pygidium is exposed. All the Carpophilinae have shortened elytra exposing two or three tergites. Thus *Conotelus* resembles Staphylinidae

of the tribes Piestini or Phloeocharini. The epipleurae are usually broad and often extend to the apices.

The metathorax is large; the rather broad episternum extends along its entire length. The sternum is often divided by a suture medianly from its posterior margin. In many genera there is a triangular space on each side of the sternum bounded by the mesocoxa, the episternum, and an oblique raised line, evidently not a suture. Blackburn (1891) calls it for convenience the "intermediate plate" and thinks it is the mesosternal epimeron. As noted above, the writer thinks another sclerite is the mesosternal epimeron and that this space is much too posterior to be a mesopleurite. Since the space may be variously developed and even absent within a single genus (*Carpophilus*) or even species (*Carpophilus lugubris*), the writer believes it is part of the metasternum. In *Carpophilus sayi* the space is strongly transverse, with only a suggestion of obliquity at the distal end of the suture. Murray (1864) calls it the axillary piece. This writer, following Fall (1910), refers to it in the text as the "axillary space". The posterior coxal cavities are closed behind, strongly transverse, and extend to the margins of the body.

The wings of all but one of the Nearctic genera are figured. The figures show that the degree of development of the veins is proportional to the size of the species. Venation is almost absent in the smaller genera and well developed in the larger genera. Evidently it is impossible to draw up family characters of venation from a sample genus, as has been done in the past. The folding is extremely complex, so that the venation of the distal half of the wing is almost absent. A median, cubitus, and some anal veins are more or less normal, whereas the veins anterior to the median are greatly anastomosed and crowded near the base of the wing near its anterior margin. The wing is lobed at its base. The absence of the lobe in the figures of two of the genera is probably due to errors in dissection.

The legs are rather short and somewhat retractile. The coxae are strongly transverse but never contiguous. Actually the anterior coxae are probably always contiguous beneath the prosternal process. The femurs are sometimes canaliculate for the reception of the tibiae. The tarsi are almost always dilated with a cushion of hairs beneath; the fourth segment is minute, the fifth about as long as the first three, and the claws are either toothed or simple.

The abdomen is composed of seven tergites and five sternites. The characteristically shield-shaped seventh tergite and fifth sternite are the pygidium and hypopygidium respectively. Contrary to Gangle-

bauer (1899) the writer believes with Lesne (1939) that the hypopygidium represents the seventh sternite. Since only five sternites are visibly distinct, two basal sternites have anastomosed. There are six spiracles on the antero-lateral margins of the tergites.

The male has a well developed additional or eighth tergite always present and visible in most genera. Reitter and Horn speak of the additional dorsal segment of the male as the sixth. Murray says it is either the seventh or eighth. Ganglebauer (1899), Lesne (1938), and the present writer call it the eighth. Lesne (loc. cit.) speaks of the male eighth segment as the pygidium. Since, with Coleoptera, it is impossible to speak of the true pygidium and since the additional segment is not visible in some male and all female nitidulids, the writer believes that the characteristically shaped seventh dorsal segment of both sexes should be termed pygidium.

The genitalia, as described here, are mainly the highly modified distal abdominal segments. An examination of the plates will elucidate the following descriptions.

In the male the eighth tergite is well developed but the eighth sternite is much reduced. To the sternite is attached a strut. The ninth tergite (epandrium) and sternite (hypandrium) form a highly sclerotized tubular structure or tegmen, which serves to guide the ejaculatory duct into the vulva. A pair of parameres, articulated to the tegmen, may or may not be present. As the figures show, the structure of the male genitalia varies greatly between genera but the writer has been unable to detect useful specific differences.

The female genitalia are less specialized than the male. The eighth tergite and sternite are only slightly modified. As in the male, the sternite is attached to a ventral strut or spiculum ventrale. The eighth segment is connected by a long intersegmental membrane to the valvifer and paraproct. The paraproct is dorsal and evidently borne on the distal part of the valvifer. The valvifer bears ventrally a pair of appendages termed coxites, which in turn bear a pair of probably tactile styli. Between the coxites near their base on the ventral side is the vulva, which connects with a large bursa copulatrix by way of the vagina. A slender duct joins the consistently oval spermatheca (with its gland) to the bursa copulatrix.

Wandollek (1905) maintains that the paraproct, valvifer, and coxite compose the ninth tergite and sternite. Verhoeff (1894) added the styli to the ninth sternite. Wheeler (1893), Crampton (1925), and Tanner (1927) say the coxites, with their styli, are appendages of the ninth sternites and that the proctiger is the tenth tergite. The

Nitidulidae indicate nothing in disagreement with this view. Tanner (1927) proposes the term baculi for the rod-like structures of the paraprocts, valvifers, and coxites.

The female genitalia present two principal types. The first is relatively little sclerotized, elongate, slender, and with well developed styli. It occurs exclusively in the Cateretinae and in the other subfamilies, except Meligethinae. In the other type the genitalia are strongly sclerotized distally; the coxites are greatly shortened and even modified into a blade or serrate; the styli are greatly reduced and laterally placed. It occurs in the Meligethinae and sporadically in all the other subfamilies but the Cateretinae. Apparently no phylogenetic significance can be attributed to these types, nor can any correlated development of male and female genitalia be detected.

For the purpose of separating and relating species, the female genitalia are superior to the male. The coxites, in particular, offer the clearest characters.

The Rhizophagidae differ from the Nitidulidae in having ten-segmented antennae, heteromerous tarsi in the males, seven abdominal spiracles, galea present (as in the Cateretinae), and distinctive larva. They seem to be intermediate between the Nitidulidae and the Ostomatidae. The Cybocephalidae differ in having four-segmented tarsi, body retractile, mandibles in repose resting against the metasternum, five abdominal spiracles, and distinctive larvae. For these reasons it seems best to separate the two families as the nearest relatives of the nitidulids.

Taxonomy

Nomenclature. In determining problems of nomenclature the writer has followed the *International Rules of Zoological Nomenclature* (1926, Proc. Biol. Soc. Wash., 39: 75–104). The designation of genotypes in this family has never been accomplished. This omission is remedied for the Nearctic genera. Whenever the genus is not monotypic or the type is not designated in the original description, the first valid species mentioned by the describer of the genus is employed. In order to corroborate the inclusion of the type species in the genus, the writer has examined the genotype in almost every case.

For all names binomials only are employed. Occasionally varieties will be raised to subspecies or species relegated to subspecific status. When this is done, the writer believes trinomials should be used.

In finding the proportions of the prothorax and elytra the writer has measured the greatest possible width and length.

Explanation of terms. One of the chief excuses for the account of morphology is to make the descriptions as explicit as possible. At least two terms, however, may be explained here. The epistoma of previous authors is the clypeus. By "dorsal segments" is meant the abdominal tergites exposed behind the elytra, including the pygidium. The abbreviation "M.C.Z." stands for the Museum of Comparative Zoölogy.

Diagnosis of the family: adults. Very variable in shape; small or medium in size. Antennae inserted under the frontal margin in front of the eyes; eleven-segmented; a three-segmented club usually very distinct but sometimes only slightly developed. Antennal grooves usually present. Mouthparts normal; galea present only in the Cateretinae. Elytra entire, sometimes shortened to expose two or three abdominal segments. Prosternum with a process produced between the front coxae. The metepisterna attaining the metacoxal cavities. All coxae transverse and separated. Anterior coxae with free trochantin and either open or closed behind. Middle and hind coxae closed behind. Hind coxae almost attaining the lateral margins of the body. Legs short and moderately retractile. Tarsi five-segmented, first segment of normal size, the fourth very small, and the fifth longest. Abdomen with six spiracles; five visible sternites; seven tergites, and in the male often an eighth tergite is visible.

Larvae. Body sparsely haired. Head transverse, mouth porrect, clypeus feebly distinct, labrum distinct. Maxillae deeply retracted, maxillary palpi two or three-segmented. Labial palpi very short, two-segmented. Ocelli variable. Legs rather short.

Key to subfamilies of Nitidulidae

1. Maxillae with one lobe (lacinia); antennae distinctly capitate. . . . 2
   Maxillae with two lobes; antennae feebly capitate. . . . Cateretinae
2. Abdomen covered, at most with the pygidium exposed. 3
   Abdomen with two or three segments exposed. . Carpophilinae (p. 150)
3. Labrum free, more or less visible 4
   Labrum connate with the clypeus 5
4. Mesosternum not carinate; or the prosternum depressed behind the coxae and not prolonged, or the pronotum margined at base . . . . . Nitidulinae (p. 182)
   Mesosternum carinate; prosternum elevated and prolonged behind, the tip enlarged, free, and overlapping the mesosternum; pronotum not margined at base; all tarsi dilated. . Meligethinae (p. 251)
5. Suture of the labrum more or less distinct. . . . Crytarchinae (p. 257) (no alternate)

CATERETINAE

Cateretes Er., 1843, in Germar, Zeitschr. für Ent., 4: 226 Brachypterinae auct.

This subfamily contains fifteen genera, none of which contain many species. Six genera, two endemic, are found in the Nearctic region.

Key to genera of Nearctic Cateretinae

1. Claws simple 2
   Claws distinctly dentate at base 4
2. Length under 3 mm 3
   Length over 3 mm 5
3. Color of elytra testaceous to piceous ..... *Cateretes*
   Color of elytra metallic blue-green ..... *Boreades*
4. Posterior pronotal angles obtuse ..... *Brachypterus*
   Posterior pronotal angles rectangular ..... *Brachypterolus*
5. Body convex ..... *Amartus*
   Body depressed ..... *Inthonaeus*

CATERETES Herbst

Plates 1, 12

Kateretes Herbst, 1793, Natur. aller bek. u. ausl. Insekten **5**, 11, ex parte. Type: *Nitidula pedicularis* L.

Cateretes pro *Kateretes* Illiger, 1798, Verz. Käf. Preuss., p. 395, ex parte.

Cercus Latreille, 1796, Précis Caract. gen. Ins., p. 68. Type: *C. rufilabris* Latr.

Anisocera Stephens, 1832, Ill. Brit. Ent., **5**, 438. Type: *C. pedicularis* L.

Anomaeocera Shuckard, 1840, Col. delin., p. 25. Type: *C. pedicularis* L.

Subgenus *Pulion* des Gozis, 1886, Rech. de l'esp. typ. Monlucon, p. 12.

Head much narrower than the pronotum, emarginate, front separated from the clypeus by a transverse furrow or by a fine transverse line. Antennae with a rather narrow, indistinct club; in the male of the subgenus *Cateretes* s. str. the first two segments or only the first are enlarged. Labrum transverse, deeply emarginate, with broadly rounded lobes. Mandibles broadened on the outer side of the base, with a single untoothed apex. Lacinia terminating in a point which is bent inwards almost at right angles, a tuft of hair at the bend; galea is very slender and glabrous. Maxillary palpi short and thick, first segment a little shorter and slenderer than the second; second and third of equal width, third somewhat longer than the second, the apical segment as long but slenderer than the second. Mentum strongly transverse. First segment of labial palpi very small, second short and clavate; the apical segment as long as the other two seg-

ments combined. Pronotum as broad or somewhat narrower than the elytra, rounded on the sides, often more strongly narrowed anteriorly than posteriorly, with rounded angles; sides narrowly arcuate; at the base slightly rounded. Scutellum large, triangular. Elytra with narrow epipleurae; pygidium free and broadly truncate. The prosternal process between the front coxae narrow. The mesosternal process broader, middle coxae further apart than the front coxae. Metasternum about as long as the first two ventral segments together. Metepisternum pointed posteriorly. First ventral segment, in the middle, as long or longer than the second and third together, second and third short, fourth and fifth longer. A dorsal segment visible behind the pygidium in the male of the American but not the European species. Femurs rather short, tibiae gradually broader towards the apex. The first three tarsal segments dilated, of equal length, long thick hairs on the under side; third tarsal segment deeply bilobed; the fourth very small, the fifth about as long as the first four combined. Claws simple.

Since *Cateretes* is the most generalized nitidulid, its description is made particularly complete.

Of the New World genera *Cateretes* is nearest to *Boreades* new genus but differs in a number of ways, as shown in the figures; *Cateretes* is also close to the European *Heterhelus* but differs in the shape of the pronotum, labial palpi, mentum, and maxillae.

The larva of *C. rufilabris* (Latr.) has been described by Perris, 1876, Ann. Soc. Ent. Fr. p. 214; Larves de Coleopt. 1877, pp. 38–39.

In Europe the larvae live in the flowers of *Juncus* (Juncaceae) and pupate in the earth; the adults are found on the flowers of *Spiraea* (Rosaceae), sedges (Cyperaceae), rushes (*Juncus*), and generally in swampy places.

The genus *Cateretes* is strictly Holarctic. Two species are Nearctic and five are Palaearctic. The types of the Nearctic species have been examined in the British Museum, and all of the species, except *C. flavicans* Fairm. (Algeria), have been examined in the writer's collection.

Key to subgenera

1. In the males the first or also the second antennal segment dilated. Antennae usually in the female extending beyond the hind margin of the pronotum. Head strongly transverse, with small, strongly prominent eyes; a deep transverse line between the bases of the antennae. Pronotum with evenly rounded hind angles, weakly convex, coarsely and sparsely punctate. . . .Subg. *Cateretes* s. str.

2. Antennae simple in both sexes, not attaining the hind margin of the pronotum. Head weakly transverse, with larger, weakly prominent eyes and finer clypeal suture. Pronotum with evenly rounded or more or less quadrate hind angles, more strongly convex; less coarsely and sparsely punctate . . . . . Subg. *Pulion*.

Key to species of subgenus Pulion

Elytra sparsely punctate, the distance between the punctures greater than the size of the punctures . . . . . *pennatus*.
Elytra densely punctate, the distance between most of the punctures less than the size of the punctures . . . . . *sericans*.

Cateretes (Pulion) pennatus (Murray)

Plate 1, figs. 1–4, 7; 12, fig. 1

Cercus pennatus Murray, 1864, Trans. Linn. Soc. London, 24: 235.
Cercus crinitus Murray ♂, *loc. cit.*, p. 237.
Types: of *pennatus* from "Canada, Pennsylvania, and other parts of North America"; of *crinitus*, from Tennessee, are in the British Museum.

Oval; moderately robust; typically dull fulvous or dark piceous but may be testaceous or ferrugineous; moderately shining; sparsely pubescent. Head moderately densely punctate, front feebly bi-impressed, with a transverse black line joining the two impressions. Thorax with width and length as 1.5 to 1; apex hardly if at all emarginate; sides rather strongly arcuate, in the female slightly sinuate posteriorly, in the male evenly arcuate, margin narrowly reflexed; disc rather strongly convex, moderately densely punctate. Scutellum coarsely but sparsely punctate. Elytra with length to width as 1 to 8, apices truncately but evenly rounded, surface not coarsely nor densely punctate. Pygidium sparsely punctulate, the entire hind margin of the tergite anterior to the pygidium showing from beneath the elytra. Body beneath sparsely punctulate. Legs and antennae are usually paler than the body. Length 1.9–2.5 mm.

This species is so closely related to *sericans* that the two cannot always be separated with certainty. But *pennatus* is larger, more robust, apices of the elytra more rounded, more of the abdomen showing, more densely and coarsely punctate elytra, antennal club more distinctly of two not three segments and the pronotum proportionately wider.

This species occurs (May-July, mainly May) from Quebec to North Carolina (Gray Beard Mt.) west to Kansas (Douglas Co., Argentine) across Canada to British Columbia (Terrace, Frazer Valley, Kaslo,

Cawston, Steelhead) south in the coastal region to California (Ventura, S. Paula, Berkeley on *Sambucus*) where it seems to intergrade with *sericans*.

Cateretes (Pulion) sericans (Leconte)

Plate 1, figs. 9, 12

Cercus sericans Lec., 1869, Proc. Ac. N.S. Philadelphia, p. 69.

Type: from "Tejon" Fort Tejon, California, lectotype ♀, M.C.Z. no 6988 and 4 cotypes (3 ♀ ♀, 1 ♂). A cotype is in the British Museum.

Oval; slightly oblong; usually testaceous, often with head and elytra piceous, occasionally entirely castaneous to dark piceous above with pale legs and antennæ; surface feebly shining; sparsely pubescent. Head sparsely punctate, front with fine black transverse line. Antennal club feebly three segmented. Thorax with width to length as 1.3 to 1, apex not emarginate, disc strongly convex, moderately densely punctured, margin very narrowly reflexed, sides not strongly arcuate, in the female slightly sinuate posteriorly, in the male evenly arcuate. Scutellum rather coarsely and sparsely punctate. Elytra with length to width as 1.2 to 1, surface densely and coarsely punctate, apices obliquely, truncately, rounded. Only the outer angles of tergite anterior to pygidium show from beneath the elytra. Length 1.5 to 2.3 mm.

For the relationships of *sericans* see under *pennatus*. In central and northern California specimens tend to be larger, darker and more robust than usual.

This species occurs (May-August) from Washington (Cooks) to southern California (San Diego) east to Nevada (Lovelock), Utah (Ogden, Wasatch), Arizona (Flagstaff, Williams, Globe) and New Mexico (Cloudcroft).

Cateretes (Cateretes) scissus spec. nov.

Plate 1, figs, 5, 6

Cateretes bipustulatus Payk. auct. in parte

Closely related to the European *pedicularis* L. but averaging a little smaller, antennal club a little more compact, and the second antennal segment subglobose instead of elongate in the female. Color a rich reddish brown or black; shining; a broad oblique band on each elytron, or in the black specimens a black v-shaped spot on the anterior part of the elytra and the rest of the elytra testaceous; clypeus, antennæ, and legs testaceous. Head closely, coarsely punctate; thorax coarsely but

rather sparsely punctate, feebly alutaceous; elytra coarsely and more closely punctate than the thorax. Thorax with length to width as 1 to 1.7, lateral margins very narrowly reflexed. Thorax and elytra finely and sparsely pubescent, pygidium more strongly pubescent. Beneath finely punctate, sparsely pubescent. Length 2.1 mm., width 1.1 mm.

Holotype ♂ and allotype collected July 8, Edmonton, Alberta (F. S. Carr) in Mus. Comp. Zool. (H. C. Fall collection); paratypes Tewksbury, Mass. in M.C.Z. (Blanchard collection); one Tewksbury and another Mass. (S. Henshaw) specimen in the New England Museum of Natural History, Hopkinton, Mass. (Frost coll.); and several from Edmonton, Alberta (May 24–August 7) in the collections of the Univ. of California, Univ. of Kansas, C. A. Frost, and the writer.

This species has been recorded by Horn, 1879, under the name *bipustulatus* Payk., but it is really nearer to *pedicularis* Linn.

Boreades genus nov.

Plates 1, 12

Cercometes auct. ex parte, Reitter, 1875, Verh. Nat. Ver. Brünn, p. 99. Genotype: *Cercus politus* Reitter.

Head much narrower than pronotum, front separated from clypeus by an incomplete transverse furrow. Antennæ with a distinct three-segmented club, the terminal segment bluntly sub-appendiculate at tip. Eye facets fine. Labrum transverse, not strongly emarginate, with truncately rounded lobes. Mandibles only slightly broadened with a single untoothed apex. Lacinia attenuate at tip, galea slender. Maxillary palpi rather long and thick; the apical segment not thicker than the others but as long as the second and third combined. Mentum not strongly transverse. First segment of labial palpi small, second about twice as long as the first and second combined. Pronotum not as broad as the elytra, the sides moderately arcuate, and the posterior angles obtusely but not broadly rounded. Scutellum large and bluntly triangular. The narrow epipleurae only along the anterior half of the elytra; pygidium free and rounded. Prosternal process narrow, subparallel, tip rounded, and extending to posterior margin of coxae. Mesosternal process twice as broad as the prosternal process, broadly rounded. Metasternum at middle about as long as first two ventral segments combined. Metepisternum pointed posteriorly. First ventral segment at middle as long as the second and third combined. Second segment short, third a little longer, fourth a little longer than the third, and the fifth a little longer than the fourth. In the male a

broadly rounded dorsal segment appears behind the emarginate pygidium. The first three tarsal segments dilated, of equal length, the fourth segment very small, the fifth as long as the first two combined. Claws simple. Genotype: *Cercometes abdominalis* (Er.), described under *Cercus*.

Reitter says of *Cercometes* that the labial palpi are four-segmented (evidently assuming that the palpiger is a segment) and that the first three segments are minute, the claws are dentate, the clypeus by no means distinct, and the pygidium simple in both sexes. All of these characters necessitate separating *abdominalis* to form a new genus. *Boreades* seems to be intermediate between *Cateretes* and *Brachypterus* and rather close to *Heterhelus* in which Reitter placed *abdominalis* when he described the South American *politus*. Reitter subsequently made *politus* the type of his new genus *Cercometes*.

The genus *Boreades* contains one North American species. The adults have been collected by the writer on the blossoms of blackberry, *Rubus* (*Eubatus*) spp., and elderberry, *Sambucus canadensis*.

Boreades abdominalis (Erichson)

Plate 1, figs. 13–21; pl. 12, fig. 2

Cercus abdominalis Erichson, 1843, in Germar, Zeischr. für die Ent., 4:229.
Cateretes abdominalis (Er.) auct.
Type: "North America", probably Pennsylvania in the Berlin Museum (Knoch Collection).

Oval, convex, metallic blue-green, shining, antennæ, abdomen, and legs rufous, antennal club piceous. Head, pronotum and elytra very feebly pubescent; underside and abdomen more strongly pubescent. Head densely punctate. Thorax convex; width to length as 1.6 to 1; base a little wider than the apex; sides moderately arcuate, narrowly reflexed, feebly sinuate near the subrectangular basal angles; surface equally punctate, punctures moderately coarse not dense. Scutellum bluntly and broadly rectangular, moderately densely punctate. Length to width of elytra conjointly as 1.1 to 1, sides feebly arcuate, narrowly reflexed, convex, a little more coarsely and densely punctate than the pronotum. Prosternum densely and coarsely punctate, body beneath less so, and abdomen still less so. Length 2-3 mm.

This species is found (April-August) from eastern Canada to Georgia (Clayton) west to Texas (Dallas), Missouri, Nebraska (Lincoln), Kansas (Argentine, Muncie, Kansas Co.), Iowa (Burlington) and Manitoba (Aweme).

Brachypterus Kugelann

Plates 1, 12

Brachypterus Kugelann, 1794, in Schneider's Mag., **1**, 560. Genotype: *Dermestes urticae* Fab.

Virbius Des Gozis, 1886, Recherche de l'esp. typ., p. 11.

Head narrower than pronotum, front separated from the clypeus by an incomplete transverse furrow. Antennæ with a distinct but loosely connected club. Labrum transverse, not strongly emarginate. Mandibles not broadened on the outer side of the base, with a fine tooth near the apex. Lacinia and galea slender. Maxillary palpi rather long and thick; the apical segment thinner than the others and as long as the second and third combined. Mentum triangular, the anterior angle deeply emarginate. First and second segments of the labial palpi very small, the third large, subglobose, twice as long as the first two combined. Pronotum almost as broad as the elytra, sides more or less strongly arcuate; posterior angles obtusely rounded. Scutellum large, triangular. Epipleuræ narrow, not extending half way posteriorly. Pygidium free and rather acutely rounded. Prosternal process becoming broader posteriorly, truncate, not extending beyond the coxæ. Mesosternal process not quite twice as broad as the prosternal process, broadly rounded. First ventral segment in the middle longer than the next two combined. Second and third of equal length, fourth longer, fifth much longer than the fourth. In the male a broadly rounded dorsal segment behind the feebly emarginate pygidium. Tarsi dilated, the fifth segment as long as the first three combined. Claws strongly dentate.

Brachypterus is intermediate between *Boreades* and *Heterhelus* on one hand and *Brachyleptus* and *Amartus* on the other. The Australian *Notobrachypterus*, placed by Grouvelle between *Brachypterus* and *Brachyleptus*, is unknown to the writer.

In Europe the larvæ and adults live in the flowers of nettles (*Urtica*) and pupation is in the earth.

The genus *Brachypterus* occurs in the Holarctic and Neotropical regions with one species in East Africa. Sixteen species are Palæarctic, four are Nearctic (one of which is Holarctic), and three are Neotropical. The genus seems to be ancient, since two species are restricted to the Canary Islands, another occurs on the Canaries and in southern Europe; one is found in Algeria, Sardinia, and Corsica; another in Algeria and the Balearics; a species occurs in Sardinia and the Canaries; and one in the Grenadines of the Lesser Antilles. Most of the species are re-

stricted to arid regions but they cannot very well be called relicts of a time when the earth was generally arid, because the earth was probably never so arid as now.

1. Sides of pronotum meeting the base in a continuous curve, prothorax pale brown (Texas) ..... *schaefferi*
   Sides of pronotum not meeting the base in a continuous curve, prothorax dark brown 2
2. Sides of pronotum usually not sinuate posteriorly (California) ..... *troglodytes*
   Sides of pronotum usually sinuate posteriorly (Rocky Mountains eastward) 3
3. About 2.2 mm. long, sutural angles of elytral apices slightly rounded (Cordilleran region) ..... *globularius*
   About 1.9 mm. long, sutural angles of elytral apices very slightly if at all rounded (Eastern States, Europe) ..... *urticae*

Brachypterus schaefferi Grouvelle

Brachypterus rotundicollis Schaeffer, 1905, Sci. Bull. Brooklyn Inst. Mus., **1**, 146. (non *rotundicollis* Murray, 1864).
Brachypterus schaefferi Grouvelle, 1913, Ann. Soc. Ent. France, **81**, 387.
Type: No. 42560 collected in April at St. Tomas, Brownsville, Texas, in the U. S. N. M.

Oval, brownish, thorax paler, elytra with slight aeneous tinge, shining, sparsely pubescent. Head coarsely punctate. Antennae rufous. Prothorax, at its broadest part, as wide as the elytra at base, coarsely not very densely punctate, sides evenly arcuate, meeting the base in a continuous curve. Elytra more coarsely and densely punctate than the pronotum, apices truncate, sutural angles slightly rounded. Pygidium sparsely and obsoletely punctate. Prosternum in front with a few scattered punctures; metasternum coarsely punctate; abdomen obsoletely punctate, legs rufous. Length 1.5 mm.

Sharp, 1889, Biol. Centr.-Amer. Coleopt. 2:265, records specimens from Cordova, Mexico (400 miles south of Brownsville) as doubtfully *urticae*, because the pronotum was shaped as in *schaefferi*. Evidently *schaefferi* is an offshoot from *urticae* but a little more distinctly punctate.

This rare species is known (Jan., March, April, October) from Texas (Olmito, on stinging nettle, Victoria, and Brownsville at St. Tomas and Esperanza Ranch) and possibly Cordova, Mexico (B.M.).

Brachypterus troglodytes Murray

Brachypterus troglodytes Murray, 1864, Trans. Linn. Soc. London, 24: 244. Type: from California in the British Museum.

Oval; convex; brown to black, usually piceous, with a slight aeneous tinge, antennae and legs rufous, sparsely finely pubescent. Head coarsely punctate except along an obscure, median, longitudinal line; also a shallow transverse furrow, enlarged at each end, between the eyes. Pronotum usually with the sides evenly arcuate but sometimes with a trace of sinuation posteriorly; surface sparsely, coarsely punctate. Elytra more sparsely punctate than the pronotum, apices nearly transversely truncate. Beneath alutaceous, the metasternum sparsely punctate; its epimeron more strongly alutaceous. Length 1.8-2 mm.

This species differs from *urticae* in that the sides of the pronotum are usually evenly rounded not sinuate, the pronotal punctations coarser, the clypeal suture more pronounced, the elytral humeri less pronounced, and the elytral apices more truncate.

This species occurs (March-August) from British Columbia (Victoria, and doubtfully Metlakatla), through Washington (Skokomish R. Tenino), Oregon, to southern California (Mono Lake, Los Gatos, Pomona, Pasadena), east to Arizona.

Brachypterus globularius Murray

Brachypterus globularius Murray, 1864, Trans. Linn. Soc. London, **24**, 245. Cotypes: from Connecticut and Mexico in the Laferte collection.

The location of this portion of the Laferte collection is unknown but may be in the Paris Museum or in the R. Oberthur collection at Rennes.

Very similar to *urticae* but larger, punctation coarser, and sutural angles of the elytral apices less obtuse. The metasternum sparsely, coarsely punctate; the epimeron less sparsely, more finely punctate, and strongly alutaceous. Piceous, antennae and legs paler. The types have not been seen, and Murray says the sides of the pronotum are evenly rounded. Yet in all the specimens I have seen the sides of the pronotum are sinuate posteriorly; so the types may be termed "atypical." In both *troglodytes* and *urticae* the pronotum may or may not be sinuate. The clypeal suture and elytral humeri are as in *urticae*. Length about 2.3 mm.

Specimens from northern California and British Columbia seem to

intergrade with *troglodytes*, but *globularius* is usually larger, more strongly punctate, pronotum more distinctly sinuate.

This species was described from Mexico and Colorado, and Murray adds Connecticut but this is probably a mistake. Authentic specimens have been seen from Alberta (Edmonton), Colorado (Glenwood Springs), and California (Half Moon Bay) and specimens that are doubtfully this species from California (San Francisco, San Mateo, Alameda Co.) and British Columbia (Metlakatla). The dates run from April to August.

Brachypterus urticae (Fabricius)

Plate 1, figs. 22–28; pl. 12, fig. 3

Dermestes urticae Fabricius, 1792, Ent. Syst., **1**, 235.
Cercus pusillus Melsh., 1846, Proc. Acad. N.S. Philadelphia, **2**, 105.
Types: of *urticae* on *Urtica* in Germany (Helwig) and possibly in Kiel; of *pusillus* from Pennsylvania in M. C. Z. (Melsheimer collection).

Oval; convex; surface shining and very sparsely pubescent; piceous or brownish with a slight aeneous tinge, antennae and legs rufous. Sparsely, moderately coarsely punctate. Elytra slightly more sparsely and finely punctate than the pronotum, the apices variably truncate. Clypeal suture fine. Sides of the pronotum arcuate and posteriorly usually sinuate, but the sinuation may be absent and the sides almost parallel. Elytral humeri moderately prominent. Metasternum alutaceous, finely and sparsely punctate. Length 1.5—2 mm.

Murray, 1864, places the American specimens as a variety of *urticae* because the sinuation of the pronotum is evanescent, but this character is not at all constant. The relationships of *urticae* are discussed under the other species.

The adults are found on the flowers of nettles (*Urtica*).

This widespread species is found over most of the Palaearctic region and may possibly be introduced into North America, because in 1879 it was known only from the Atlantic states. Whereas at present it is known (June-September) from Ontario (Ridgway, Prince Edward Co.) and Quebec to Virginia, west to Missouri (St. Louis), Iowa, Wisconsin, north to Alberta (Edmonton) and British Columbia (Bear Lake, Kaslo) south to Washington (Seattle) and Colorado (Montrose, Placerville, La Veta, Garland, Powder River).

Brachypterolus Grouvelle

Plates 1, 12

Heterostomus Jacq. du Val, 1858, Gen. Coleop. d'Eur., **2**, 136. (non Bigot, 1857, Diptera). Type: *Catheretes gravidus* Ill. = *Brachypterolus pulicarius* (L.).
Brachypterolus Grouvelle, 1913, Ann. Soc. Ent. France, 1912, **81**, 387.

Head much narrower than pronotum; no visible line between the clypeus and front. Antennae with a distinct three-segmented club, the terminal segment sub-appendiculate at tip. Labrum transverse, weakly emarginate. Mandibles broad, untoothed, with long tips. Lacinia terminating in a point which is bent inwards almost at right angles, a tuft of hair on each side of the point; galea very slender and doubtfully glabrous. Maxillary palpi short and thick, the apical segment thinner and shorter than the second and third combined. Mentum small, very strongly transverse, anterior angles very broadly rounded. First segment of labial palpi rather large, the second rather long and slender, the apical segment large, clavate, longer than the first two combined. Pronotum very nearly as broad as the elytra, posterior margin on each side broadly emarginate. Scutellum large, triangular. Elytra with only a vestige of the epipleurae at the humerus; the sixth and seventh abdominal tergites visible from above. Pygidium truncate above the eighth dorsal segment in the male. Prosternal process parallel, narrow, and not extending posterior to the coxae. Mesosternal process emarginate, about three times as broad as the prosternal. Metasternum feebly emarginate posteriorly. First ventral segment, at middle, and fourth of equal length, either one longer than the second and third combined; fifth longer than the fourth. Tarsi dilated, with dense, long hairs beneath, the fourth tarsal segment very small, the fifth as long as the first two combined. Claws toothed.

Grouvelle (1913) places *Brachypterolus* between *Amartus* and the aberrant Oriental *Chalonecrus*. I believe *Brachypterolus* is nearer to *Brachypterus* than to *Amartus*.

In Europe the larvae feed on the pollen of *Antirrhinum* and *Linaria* (Scrophulariaceae) and pupate in the earth. In America the larvae appear to breed only in the seed capsules of *Linaria*, but the adults are found on the flowers of many plants. See Cornelius, 1863, Stett. Ent. Zeit. pp. 113-115; Perris, 1877, Larves des Coleop. pp. 35-36, fig. 23-26; and the references given below.

Until recently *Brachypterolus* (8 species) was confined to the Palaearctic region. About 1918 the following European species was introduced into eastern United States.

Brachypterolus pulicarius (Linn.)

Plates 1, figs. 29–35; pl. 12, fig. 4

Dermestes pulicarius Linn., 1758, Syst. Nat., ed. 10, **1**, 357.

Brachypterolus mordelloides Notman, 1920, Journ. N. Y. Ent. Soc., **28**, 29–30.

Heterostomus pulicarius (L.) Britten, 1922, Journ. Econ. Ent., **15**, 311; 1924, 24th Rept. State Ent. Conn., p. 339; Hatch, 1924, Tech. Pub. N. Y. State Coll. Forestry, **24**, 297.

Brachypterolus pulicarius (L.) Schaeffer, 1927, Bull. Brooklyn Ent. Soc., **22**, 170; Hervey, 1927, Journ. Econ. Ent., **20**, 809–814, fig. 381; Hatch, 1928, Journ. N. Y. Ent. Soc., **36**, 35–36.

For complete synonymy vide Grouvelle, 1913.

Types: of *pulicarius* from Europe presumably in the collection of the Linnaean Society of London, of *mordelloides* from Keene Valley, New York in the collection of Howard Notman.

Oval; convex; shining black, antennae and legs pale to dark piceous. Rather thickly covered with long brownish to grey pubescence. Head, pronotum, scutellum, and elytra coarsely and closely punctate; abdomen above and below more finely punctate; metasternum coarsely punctate. Prothorax strongly emarginate in front, sides moderately arcuate, narrowed in front, hind angles rectangular. The legs, from fore to hind pair, are progressively darker. Length 1.8—2.5 mm.

Notman, 1920, separated the American specimens by description only. I am unable to discern any differences between specimens from the Old and New World.

Judging from its distribution, *pulicarius* seems to have been introduced first into eastern Canada, although the earliest record the writer knows about is in 1918 at Keene Valley, Essex Co., New York. Since then it has been collected (May-August) from Ontario (Prince Edward Co.) Quebec (Gaspé), and Nova Scotia (Bass River) south to Pennsylvania (Norwood), west to Iowa and Wisconsin. It is found generally over Europe and Siberia, where several varieties have been described on the basis of size and color of pubescence. Size is of no importance, but pubescence color is sometimes distinctive.

This species breeds in the United States in *Linaria*, is sometimes injurius to *Fragraria*, and the adults may be found on the flowers of dandelion, buttercup, wild mustard, clover, apple, and panicled dogwood.

Amartus Leconte

Plates 2, 12

Amartus Lec., 1863, Proc. Acad. N. S. Philadelphia, p. 343. Genotype: *Amartus rufipes* Lec.

Brachyleptus Motsch., 1870, (non 1845), Bull. Soc. Imp. Moscow, **42**, pt. 2, pp. 352–4. Type of the 1870 description is *Strongylus tinctus* Mann.

Pronotum more than one and one-half as broad as the head, front separated from the clypeus by a long but incomplete transverse furrow. Antennae with a distinct but loose three-segmented club, the terminal segment sub-appendiculate at tip. Labrum transverse, broadly emarginate. Mandible with a single, untoothed, rather blunt apex. Lacinia not attenuate, tip bent inwards almost at right angles. Galea slender, with an enlarged hyaline vesicle at tip. Maxillary palpi long and thick, the apical segment slenderer but as long as the second and third combined. Mentum not strongly transverse. First segment of labial palpi rather large, third attenuate apically, about as long as the second. Pronotum nearly as broad as the elytra, posterior angles broadly rounded. Scutellum large, more or less trapezoidal, mostly covered by the pronotum. Elytra rather short, exposing the penultimate tergite. The narrow epipleurae only along the anterior half of the elytra. Prosternal process very narrow, reflexed, extending to posterior margin of coxae. The mesosternal process about five times as broad as the prosternal, emarginate; mesocoxae farther apart than the metacoxae. Metasternum divaricate posteriorly. First ventral segment at middle as long or longer than the second and third combined; the fourth as long as the second and third combined. In the male a dorsal segment appears behind the truncated pygidium. First three tarsal segments broadly dilated, the fourth small, the fifth almost as long as the first four together. Claws simple, merely with the usual dilation.

Amartus occupies the dry regions of the southwest as its very close relative *Brachyleptus* Motsch. inhabits the dry Mediterranean region. It is evidently very close to *Brachyleptus*, differing in the shape of the mentum, labial palpi, pronotum, and claws. *Amartus* is further removed from *Brachypterus* and differs in the shorter elytra, simple claws, and differently shaped mentum, labial palpi, and mandibles.

In North America the adults feed on the pollen of certain Leguminaceae and Acanthaceae.

The genus *Amartus* is restricted to extreme western North America and southwestern Asia. Three of the six known species have been examined in the writer's collection.

Key to the species of AMARTUS

Form very robust, thorax very convex, apex distinctly narrower than the base ..... *tinctus*

Form less robust, thorax moderately convex, not narrower at the apex ..... *rufipes*

Amartus tinctus (Mannerheim)

Strongylus ? *tinctus* Mann., 1843, Bull. Soc. Imp. Moscow, **43**, 255.
Brachypterus ferrugatus Murray, 1864, Trans. Linn. Soc. London, **24**, 250.
Types: of *tinctus* from California, presumably in the Zoöl. Mus. at Helsinki; of *ferrugatus* from Oregon in the British Museum. A cotype of *tinctus* is presumably in the Boheman collection in the Naturh. Riksmus. at Stockholm.

Oval; robust; subopaque; moderately thickly clothed with long, greyish pubescence; color varying from dark piceous with fuscous antennae and legs to entirely testaceous. Head coarsely and very thickly punctate, pronotum less coarsely as thickly punctate, elytra more coarsely and sparsely punctate than the pronotum. Thorax with width to length as 1.3 to 1, apex a little narrower than the base and very feebly emarginate, sides feebly arcuate, hind angles broadly rounded, base broadly rounded and slightly sinuate on each side, disc convex. Elytra conjointly as wide as long, slightly narrowed toward apex, apices truncately rounded; a feeble scutellar depression. Abdomen above and below densely, finely punctate; metasternum more coarsely and less densely punctate. Length 3.9—5.5, width 1.7—2.2 mm.

This species is found (April-June) from Oregon to San Diego Co., California east in southern Arizona to the Chiricahua Mts.

Amartus rufipes Leconte

Plates 2, figs. 1–11; pl. 12, fig. 5

Amartus rufipes Leconte, 1861, Proc. Acad. N. S. Philadelphia, p. 344.
Brachyleptus lateralis Motsch., 1870, Bull. Soc. Imp. Moscow, **42**, pt. 2, pp. 352–4.
Types: of *rufipes* from Mendocino, Calif. (A. Agassiz) in the M.C.Z. (Leconte collection); of *lateralis* from central Calif., presumably in the Zoöl. Mus., Univ. Moscow.

Oblong oval; moderately convex; covered with long, rather sparse, cinereous pubescence. Head, pronotum, and scutellum black; elytra varying from black with ferrugineous sides to entirely ferrugineous. Abdomen above varying from dark piceous to ferrugineous. Beneath piceous, antennae and legs ferrugineous, posterior femurs piceous. Densely punctate all over, coarsely punctate on head and pronotum, a little less coarsely punctate on elytra, and still less coarsely punctate on the pygidium and beneath. Pronotum with length to width as 1 to 1.4, only slightly narrowed in front; hind angles and base very broadly

rounded. Elytra conjointly a little longer than wide, wider than the pronotum, narrowed a little anteriorly. Length 3.2—4 mm.

In addition to the characters given in the key, *rufipes* differs from *tinctus* in averaging a little smaller and never being entirely testaceous.

This species ranges (April-June) from San Francisco to southern California east into Arizona.

Anthonaeus Horn

Plates 2, 12

Anthonaeus Horn, 1879, Trans. Amer. Ent. Soc., **7**, 273–274. Genotype: *Colastus agavensis* Crotch.

Head much narrower than pronotum, front separated from the clypeus by an incomplete transverse furrow. Antennae with an indistinct three-segmented club, the terminal segment conical and subappendiculate at tip. Labrum transverse, strongly emarginate, with broadly rounded lobes. Mandibles broadened on the outer side of the base and a large blunt tooth on the inner margin. Lacinia terminating in a point which is bent inwards almost at right angles, a tuft of hair on each side of the point; galea is very slender and glabrous. Maxillary palpi short and thick; the apical segment thicker and longer than the first, second, and third combined. Mentum strongly transverse, anterior angles broadly rounded. First segment of labial palpi very small, second short and clavate, the apical segment as long as the other two segments combined. Pronotum not as broad as the elytra; the sides and posterior angles broadly and evenly rounded. Scutellum large, triangular. Elytra anteriorly with broad epipleurae which abruptly narrow posteriorly; pygidium free and broadly truncate. The prosternal process parallel, narrow, and not extending beyond the coxae. The mesosternal process twice as broad as the prosternal process, truncate; metasternum about as long as the first three abdominal segments combined. First ventral segment, in the middle, not as long as the second and third combined; second and third short; fourth as long as second and third combined; and fifth as long as third and fourth combined. In the male a large obliquely truncate dorsal segment behind the emarginate pygidium. Tarsi dilated, the fifth as long as the preceding three combined. Claws simple.

Anthonaeus is evidently a depressed *Amartus*, but varies in so many minor points as to necessitate separating the two genera.

The adults are found in the flowers of *Agave;* so the larvae probably live in the seed capsules.

The genus *Anthonaeus* contains only a single species which occurs in southern California.

Anthonaeus agavensis (Crotch)

Plates 2, figs 13–22; pl. 12, fig. 6

Colastus agavensis Crotch, 1874, Trans. Amer. Ent. Soc., **5**, 76.

Type: from California, no. 8313 and 4 paratypes in the M.C.Z. (Leconte collection).

Oblong oval; depressed; usually ferrugineous, sometimes black, but the elytra always testaceous. Head, pronotum, and elytra moderately punctate, sparsely pubescent. Prothorax with width to length as 1.5 to 1; sides strongly and evenly arcuate, lateral and posterior margins very narrowly reflexed. Scutellum moderately punctate. Pygidium and preceding segment exposed, more closely punctate and more thickly pubescent than the elytra. Pygidium with reflexed margins; in the male emarginate for the reception of the oval, slightly concave additional segment. Elytra conjointly a little longer than wide, becoming broader posteriorly. Prothorax beneath minutely and sparsely punctate. Metasternum coarsely punctate laterally, and the ventral segments moderately punctate. Length 3.8—4.5, width 1.8—2 mm.

This species is found (March 26-June) in the flowers of *Agave* along the coastal region of California from Santa Barbara Co. to San Diego Co.

CARPOPHILINAE

Carpophinae Er., 1843, in Germar, Zeitschr. für Ent., **4**, 226 et 233.

This subfamily contains 31 genera of which four occur in the Nearctic region. Grouvelle placed Meligethinae between Cateretinae and Carpophilinae. But the Meligethinae are most closely related to the Nitidulinae and since there are gradations between the Carpophilinae and the latter, the Meligethinae will have to be placed after the Nitidulinae. Gauglebauer placed the Meligethinae in the Nitidulinae and the present writer is strongly inclined to agree with him. More of the exotic genera will have to be dissected, however, before a definite opinion can be formed.

Key to genera of Nearctic Carpophilinae

1. Body very elongate 2
   Body at most oblong 3
2. Body convex, hypopygidium and pygidium long, conical . . *Conotelus*
   Body depressed, hypopygidium and pygidium short, depressed . . . . *Brachypeplus*

3. Ventral segments 1-4 short, fifth as long as the other combined.... ..... *Colopterus*
Ventral segments 2-3 short, first, fourth, and fifth longer..... ..... *Carpophilus*

Conotelus Erichson

Plates, 3, 12

Conotelus Er., 1843, in Germar, Zeitschr. für Ent., **4**, 249. Genotype: *Stenus conicus* Fabr.

Narrow, convex, elongate, tapering posteriorly. Head nearly as broad as the pronotum. Clypeus indistinct, slightly porrect, margined by a depression on each side. Eyes large and projecting. Antennae scarcely so long as the head with a large flattened club of globular outline. Antennal grooves long and slightly or strongly convergent. Labrum short, transverse, very feebly emarginate. Mandibles sharp at tip; two or three small teeth behind the tip. Lacinia short and rounded at apex. Maxillary palpi short and thick, first segment small, second and fourth about of equal length, much longer than the third. Ligula with small paraglossae, the palpi robust, first segment very small, second and third large and very thick. Mentum strongly transverse, feebly emarginate in front. Pronotum nearly as broad as the elytra. Scutellum broadly rounded posteriorly. Epipleurae broad and almost the elytral length. Elytra abbreviated, exposing the last three dorsal segments. The first two ventral segments short, of equal length; the next two segments longer, of equal length; the last segment very long, almost as long as the rest combined. Prosternal process produced behind the coxae. Meso- and metaxocae about equally separated, nearly twice as much as the procoxae. An additional tubular segment in the male. Legs short, femurs feebly canaliculate. Tarsi dilated, the fifth segment about as long as the first four. Claws simple.

Conotelus is much more closely related to *Colopterus*, and to *Brachypeplus* in particular, than to *Carpophilus*, next to which Grouvelle placed it. In fact *Conotelus* grades imperceptibly into *Brachypeplus*. Its exact relationships cannot be stated until more exotic genera have been dissected.

The genus *Conotelus* comprises about 23 species, all but one confined to the tropical and subtropical regions of the New World. Four species are found in the United States, one of which extends into eastern Canada.

Key to species of CONOTELUS

1. Abdomen acutely margined. Head prolonged behind the eyes. Sides of thorax posteriorly sinuate ..... *stenoides*
   Abdomen slightly if at all margined. Head very slightly prolonged behind the eyes. Sides of thorax not sinuate posteriorly 2
2. Pronotum not rugulose, finely granular between the punctures .... *punctatus*
   Pronotum distinctly and finely rugulose between the punctures ... 3
3. Tibiae testaceous (Rocky Mts. eastward) ..... *obscurus*
   Tibiae almost always piceous (southwestern United States and Middle America) ..... *mexicanus*

CONOTELUS STENOIDES Murray

Conotelus stenoides Murray, 1864, Trans. Linn. Soc. London, **24**, 338.
Type: from Panama (Motschulsky) in the British Museum.

Elongate, subdepressed, sparsely pubescent, color varying from brown to black. Head finely, subrugulosely punctate. Prothorax as wide as long, sides very feebly arcuate, abruptly sinuate at the posterior angles. Margin moderately prominent and more or less distinctly crenulate, surface subrugosely, closely, variolose. Scutellum strongly transverse. Elytra conjointly with width to length as 1.1 to 1, finely striate, intervals with a row of shallow, coarse punctures, each bearing a semierect hair, surface finely, subgranularly alutaceous. Abdomen acutely margined, alutaceous, and sparsely punctate; pygidium in the male truncate, not emarginate. Prosternum rugulose. Antennae and legs testaceous, antennal club fuscous. Length 3.5–4 mm.

This species occurs (March-November, mainly April and May) from Florida (many localities) through Alabama (Kushla), Louisiana (Vowell's Mill, Winfield) to Oklahoma (Ada) and eastern Texas (many localities) south through Mexico (Vera Paz, Cordova, Jalapa), Guatemala (S. Geronimo), Nicaragua (Chontales), to Panama (Bugaba, Volcan de Chiriqui).

CONOTELUS PUNCTATUS Schaeffer

Conotelus punctatus Schaeffer, 1911, Journ. N.Y. Ent. Soc., **19**, 116.
Type: from Lake Worth, Florida (O. Dietz) in the U.S.N.M.

Elongate, moderately convex, sparsely pubescent, piceous with pale brown elytra. Head subrugosely, subgranularly, moderately closely punctate. Prothorax with width to length as 1.3 to 1, sides feebly ar-

cuate, slightly narrowed anteriorly, lateral margins very narrow, smooth, posterior margin bisinuate, surface granular, sparsely but distinctly punctate. Elytra conjointly slightly longer than wide, surface finely granular with rows of punctures, each with a suberect hair. Abdomen sparsely punctate, pygidium in the male acutely emarginate. Prosternum finely alutaceous. Antennae and legs testaceous. Length 3.5–4.2 mm.

Evidently *punctatus* is intermediate between *stenoides* and *obscurus* and nearer the former. An apparently unnamed species, closely allied to *punctatus* but from British Guiana, is in the collections of the British Museum and the writer.

This species occurs, throughout the year but chiefly in the spring, in southern and central Florida (from Matecumbe Key to Lake County). Specimens from St. Thomas, Virgin Islands (B. M., Cambridge Univ. Mus.) are apparently identical.

Conotelus obscurus Erichson

Plates 3, figs. 1–10; pl. 12, fig. 7

Conotelus obscurus Erichson, 1843, in Germar, Zeitschr. für Ent., **4**, 252.
Type: from "North America" (eastern United States), in the Knoch collection and from Zimmermann, in the Berlin Museum.

Elongate, moderately convex, sparsely pubescent, color varying from dark piceous to black, the elytra from light to dark piceous. Head subrugosely, sparsely punctate. Prothorax with width to length as 1.5 to 1, sides feebly arcuate, obliquely narrowed anteriorly, lateral margins very narrow, posterior margin feebly bisinuate, surface subrugosely, subgranularly, variolosely punctate. Elytra conjointly as long as wide, surface granular, closely, irregularly covered with rows of variolose punctures. Abdomen finely granular, sparsely punctate. Pygidium in the male acutely emarginate. Prosternum finely granular. Antennae and legs testaceous, the antennal club, often the coxae, and femurs fuscous or piceous. Length 3.5–4.5 mm.

This species is most nearly related to *mexicanus* from which it was probably derived. See under *mexicanus* for differences.

This species occurs (June-September) from Ontario (Ft. Erie) to South Carolina (Batesbury), Georgia (Rayburn Co., Clayton) west through Kentucky (Henderson) to Arkansas (Polk Co.), Kansas (Miami Co.), Iowa (many localities), north to Manitoba (Treesbank); also in Colorado (Denver).

Conotelus mexicanus Murray

Conotelus mexicanus Murray, 1864, Trans. Linn. Soc. London, **24**, 337. Type: from Mexico (A. Sallé) in the British Museum.

Elongate, moderately convex, sparsely pubescent, uniformly dark piceous or black, the legs becoming somewhat paler towards their extremities, very rarely testaceous. Prothorax with width to length as 1.3 to 1, sides feebly arcuate, slightly narrowed anteriorly, lateral margins very narrow, posterior margin feebly bisinuate, surface finely, sparsely, longitudinally rugose. Abdomen narrowly margined, subrugosely, subgranularly punctate. Pygidium in the male shallowly emarginate. Prosternum subrugosely granular. Length 3.5–4 mm.

This species is closely related to *obscurus*, but the prothorax is a little narrower, the upper surface more opaque and more rugose, legs and elytra darker, and the male pygidium less deeply emarginate.

This species occurs (April-November) from southern California, Arizona (Prescott, Phoenix, Tempe, Stafford, Chiricahua Mts.), and Paris, Texas (not typical, legs testaceous) south through Lower California to Cape San Lucas and through Mexico, Honduras, Guatemala to Panama (Volcan de Chiriqui, Tobago Island).

Brachypeplus Erichson

Plates 3, 12

Brachypeplus Er., 1842, Arch. für Naturgesch., **8**, 148. Genotype: *B. planus* Er.
Nitidulopsis Walker, 1858, Ann. Mag. Nat. Hist., **2**, 206. Genotype: *N. aequalis* Walker.

Body elongate, usually depressed. Head not much narrower than the pronotum. Clypeus feebly emarginate in front, obscurely distinct; a vague fovea opposite the base of each antenna. Antennae a little longer than the head, first segment enlarged, the third elongate, the club flattened nearly round in outline. Antennal grooves short and slightly or strongly convergent. Eye facets very fine. Labrum broad, more or less indistinctly bilobed, sometimes with a notch on each side. Mandibles usually with two small teeth behind the apex. Lacinia rather short, rounded at tip, a brush of hairs on apex and inner margin. Maxillary palpi rather short and thick, first segment minute, the second unequal and large, about as long as the fourth, the third shorter than the second. Ligula large, with rather broad paraglossae. First segment of labial palpi very small, the second large and thick, the

third subsecuriform. Mentum strongly transverse, more or less emarginate in front. Pronotum about as broad as the elytra, hind angles almost rectangular. Scutellum variable, more or less transverse. Epipleurae broad, reaching the elytral apices. Elytra much abbreviated, exposing the last three segments. First two abdominal segments of equal length, shorter than the next two, which are of equal length; the last longer than the preceding. Prosternal process may or may not be produced; in *glaber* it is greatly expanded beyond the coxae. Mesosternal process truncate. Mesocoxae and metacoxae equally separated, about twice as much as the procoxae. An additional transverse dorsal segment in the male. Tarsi feebly dilated; claws simple.

Brachypeplus seems to be nearer to *Cillaeus* than to *Colopterus*, next to which it was placed by Grouvelle. Its relationship to the peculiar Hawaiian genera is not clear to the writer. *Nitidulopsis* was synonymized by Grouvelle but may very well be a distinct genus.

The genus *Brachypeplus* is tropicopolitan, except that a few species extend southward through Australia into Tasmania. Only a single rare species is found in the United States.

Brachypeplus glaber Leconte

Plates 3, figs. 11–17; pl. 12, fig. 8

Brachypeplus glaber Leconte, 1878, Proc. Amer. Philos. Soc., **17**, 398.
Type: collected by Hubbard and Schwarz, June 8, at Enterprise, Florida, no. 6961 in the M. C. Z. (Leconte collection).

Elongate; parallel; much depressed; glabrous; reddish brown, abdomen and metasternum dark piceous, antennal club dark rufous. Clypeus finely, sparsely punctate, finely granular. Rest of head moderately densely, coarsely punctate. Prothorax with width to length as 1.6 to 1, apex very feebly emarginate, sides nearly parallel, slightly narrowed in front, margin narrowly explanate posteriorly, hind angles rectangular, hind margin truncate, surface finely granular, moderately densely, coarsely punctate, except for a smooth median longitudinal line. Scutellum very sparsely punctate, finely granular. Elytra conjointly very slightly longer than wide, surface striate, striae finely punctate, intervals with rows of larger punctures, closely placed. Each elytron evenly truncately rounded. Abdomen above more finely, sparsely punctate than the pronotum, beneath more coarsely, densely punctate than above. Prosternum very sparsely punctate, the process strongly expanded behind the coxae and truncate. Length 3.3; width 1 mm.

This rare species occurs (May–July 17) in Florida (Dunedin, Capron, Lake Worth, Enterprise) and Georgia (St. Simon's Island).

Colopterus Erichson

Plates 3, 12

Colopterus Er., 1842, Arch. für Naturgesch., **8**, pt. 1, p. 149. Genotype: *Nitidula rupta* Fab.

Colastus Er., 1843, in Germar, Zeitschr. für Ent., **4**, 236.

Very flat and often broad. Head small, transverse, much narrower than the pronotum; no line or furrow separating the clypeus from the front. Antennae short, with a large, loose, oval club; antennal grooves short and convergent. Eye facets very fine. Labrum broad, bilobed. Mandibles usually with a large tooth on the inner margin. Lacinia broad and rounded at apex, usually heavily bearded. Maxillary palpus long, first segment small, the third often much shorter than the second, the fourth elongate and slender. Mentum strongly transverse, deeply emarginate. Ligula large, first segment of labial palpi small, second larger, third much larger and subsecuriform. Paraglossae very large and greatly expanded laterally. Pronotum about as broad as the elytra. Scutellum large. Epipleurae broad, reaching the elytral apices. Elytra abbreviated, exposing the last three dorsal segments. Last ventral segment recurved dorsally on the sides and in the male emarginate posteriorly. First four ventral segments of about equal length, the fifth about as long as the rest combined. Prosternal process small, barely extending beyond the coxae. Mesosternal process truncate, about three times the width of the prosternal process. In the male an additional dorsal segment. Anterior tarsi broadly, middle and hind tarsi less broadly dilated; last segment as long as first four combined. Claws simple.

Colopterus is most nearly related to *Carpophilus;* the differences mainly concern the abdominal segments and the additional segment of the male.

As may be inferred from the depressed shape of *Colopterus,* the members of this genus live under bark and feed on sap. A specimen of *C. truncatus,* in the writer's collection, was collected by H. B. Weiss in New Jersey in the shelf fungus *Polyporus graveolus.*

The genus *Colopterus* is confined to the New World where many species are known in the tropics and six species extend into or are confined to the United States.

The species of this genus are so variable that it is useless to enum-

erate many of the usual characters. Even those that are given are to be interpreted with latitude.

Key to species of COLOPTERUS

1. Hind angles of thorax distinct.....2
   Hind angles of thorax obtuse, rounded.....*truncatus*
2. Scutellum smooth at tip.....3
   Scutellum densely punctate, uniformly colored.....*unicolor*
3. Form broadly oval.....4
   Form oblong, much depressed.....*semitectus*
4. Thorax with an oblique sulcus in each hind angle.....5
   Thorax without sulcus, elytra maculate.....*maculatus*
5. Length 4–5 mm., black, each elytron depressed.....*niger*
   Length 3.5 mm., testaceous, each elytron broadly convex..*gerhardi*

COLOPTERUS TRUNCATUS (Randall)

Nitidula truncata Randall, 1838, Boston Journ. Nat. Hist., **2**, 18.
Colastus infimus Erichson, 1843, in Germar, Zeitschr. für Ent. **4**, 245.
Colastus obliquus Leconte, 1858, Proc. Acad. N. S. Philad., p. 62.
Colastus limbatus Leconte, loc. cit.

Types: This species was described from specimens collected in Maine at sap under the bark of a prostrate sugar maple in spring. Randall's types have disappeared. There are, however, two specimens from Maine which may be autotypes in the T. W. Harris collection on deposit in the Museum of Comparative Zoölogy. The types of *infimus*, from North America, Porto Rico, and Brazil, are in the Berlin Museum. The types of *obliquus* (no. 6959) and *limbatus* (no. 6960), both from California on the Colorado River near the mouth of the Gila River, are in the M. C. Z. (Leconte collection).

Oblong oval, sparsely pubescent, color varying from piceous with a large oblique paler spot on each elytron to rufo-testaceous. In the dark specimens the antennae are fuscous and the legs rufous; in the pale specimens the antennae and legs are testaceous. Head moderately coarsely and densely punctate. Pronotum very feebly emarginate, very nearly twice as wide as long, surface rather densely, sparsely punctate. Elytra with width to length as 1.3 to 1, the apex of each elytron obliquely rotundo-truncate, densely punctate. Prosternum smooth; prosternal process much reduced. Last ventral segment only showing narrowly from above on each side of the pygidium. Length 1.5–2.7 mm.

Although the specimens from California and Arizona tend to be larger and darker than those of the east, the differences in the shape and punctation of the thorax and of color, on which Leconte and Murray separated several species, are entirely too variable, even in specimens from the type locality, to warrant separation. Murray (1864, p. 282) described *Colastus triangularis* from Brazil. This species will very likely turn out to be *truncatus*, particularly since some of the cotypes of Erichson's *infimus* were from Brazil.

For biology see under the genus. This species occurs (mainly April–July, also September, February and March) from Quebec to British Columbia (Terrace) south to Florida (Haulover) west to southern California, thence south through Middle America to Brazil. In the West Indies it is known from Porto Rico and Guadelupe.

Colopterus unicolor (Say)

Plate 12, fig. 9

Nitidula unicolor Say, 1825, Journ. Acad. N. S. Philad., **5**, 183.
Colastus obscurus Erichson, 1843, in Germar, Zeitschr. für Ent., **4**, 244.
Types: The type of *unicolor* is lost. It was collected in October under the bark of yellow pine presumably in southeastern United States. There is an autotype from North Carolina in the T. W. Harris collection on deposit in the Museum of Comparative Zoölogy. This specimen is here designated the neotype. The type of *obscurus*, collected in South Carolina by Zimmermann, is in the Berlin Museum.

Oblong to oblong oval, moderately depressed, subopaque, dark piceous to rufo-testaceous, finely and sparsely pubescent. Head with coarse confluent punctures. Prothorax with width to length as 1.6 to 1, feebly emarginate in front, sides feebly and evenly arcuate, narrowing anteriorly only slightly, base very feebly sinuate on each side, surface densely covered with large shallow punctures. Scutellum and elytra densely punctate; dorsal segments more sparsely punctate. Apex of each elytron rotundo-truncate. Prosternum very obsoletely punctate, the thorax and ventral segments rather densely, finely punctate. In the male the emargination of the hypopygidium is feebly bisinuate. Length 3–4.5, width 1.2–2 mm.

Some specimens from North Carolina, Florida, and Arkansas are aberrant in being smaller, narrower, and more parallel in shape than usual. But other differences cannot be found. A male from Jacksonville, Florida (U.S.N.M.) evidently represents a distinct species since it is much broader, more convex, more coarsely and sparsely punctate than *unicolor*. Another male from the Santa Rita Mts., Arizona

(U.S.N.M.) represents another species since it is testaceous, more convex, and more sparsely punctate than *unicolor*.

This species occurs (April–September) from New Hampshire to Florida (Enterprise, Tampa, Crescent City), west to Texas, Iowa, and Michigan (Detroit).

Colopterus semitectus (Say)

Nitidula semitecta Say, 1825, Journ. Acad. N. S. Philad., **5**, 182.
The type, from eastern United States, is lost.

Elongate oval; much depressed; very sparsely pubescent, the abdomen more pubescent; moderately shining; rufo-piceous; the elytra rufo-testaceous except along the lateral and posterior margins, which are rufo-piceous. The antennae and legs are rufous; antennal club fuscous. Head sparsely and coarsely punctate. Thorax with width to length as 1.9 to 1, anterior margin rather strongly emarginate, sides feebly arcuate, narrowed anteriorly, posterior margin feebly sinuate, surface alutaceous, with sparse, large, shallow punctures. Elytra more densely and feebly punctate than the thorax, the apices almost truncate. Prosternum very sparsely punctate, alutaceous. Emargination of the hypopygidium feebly bisinuate in the male. Length 3–4.5, width 1.2–1.9 mm.

This species occurs (March–August) from Ontario and Quebec (Montreal) to North Carolina west to Texas (Columbus, Dallas), Missouri, Nebraska, Iowa (Burlington), north to Lake Superior; also New Mexico (Albuquerque) and Oregon.

Colopterus maculatus (Erichson)

Colastus maculatus Er., 1843, in Germar, Zeitschr. für Ent., **4**, 244.
Type: from North America (probably Pennsylvania) in the Berlin Museum (Knoch collection).

Broadly oval, depressed, moderately shining, sparsely covered with rather long testaceous pubescence. Above rufo-piceous, but the lateral margins of the pronotum, an oblique spot on the elytral humeri, and a spot on the inner two-fifths of each elytron extending from the anterior margin to near the apex (except the sutural margin) are rufous. There is also a rufous spot on the outer apical angle of each elytron. The long inner spot may be absent except at each extremity. Beneath light to dark rufous, antennal club fuscous. Head with coarse confluent punctures. Prothorax with width to length as 2.2 to 1,

anterior margin emarginate, sides strongly narrowed anteriorly, base sinuate on each side, surface sparsely, coarsely punctate. Elytra more densely punctate than the pronotum; dorsal segments more sparsely and feebly punctate than the elytra. Prosternum sparsely punctate, smooth. Emargination of the hypopygidium bisinuate in the male. Length 4–5, width 2–2.5 mm.

One pair from Arizona in the Leconte collection is aberrant in being smaller than average, entirely testaceous, pygidium of the male emarginate in the middle, and punctation of the pronotum and dorsal segments much denser. But adumbrations of these differences are present in typical specimens. One from "N. Y." (U.S.N.M.), possibly introduced, is aberrant in being more depressed, more elongate, more parallel, and more obsoletely punctate than usual.

This species occurs (May–August) from New York to Florida (Orange Co.), west to Texas (Victoria, Dallas), north to Iowa (Mt. Pleasant); also Arizona (Leconte coll.).

Colopterus niger (Say)

Plate 3, figs. 18–25

Cercus niger Say, 1823, Journ. Acad. N. S. Philad., **3**, 195.
Colastus morio Er., 1843, in Germar, Zeitschr. für Ent., **4**, 242.
Types: Say's types are lost. They were collected in Missouri and Pennsylvania. The type of *morio*, from North America (presumably Pennsylvania) is in the Berlin Museum (Knoch collection).

Broadly oval, depressed, piceous black, moderately shining, very sparsely covered with short pubescence. Head coarsely and densely punctate. Prothorax with width to length as 2.1 to 1, apex feebly emarginate, sides feebly arcuate, strongly narrowed anteriorly, base sinuate on each side, a vague depression on each side of the scutellum, posterior angles rectangular and containing an oblique sulcus, disc sparsely, coarsely punctate. Elytra more finely and densely punctate than the pronotum; dorsal segments more densely and finely punctate than the elytra. Elytral apices separately evenly arcuate. Beneath piceous, antennae and feet rufous, antennal club fuscous. Prosternum obsoletely and rather densely punctate. Emargination of hypopygidium feebly bisinuate in the male. Length 4–5, width about 2.5 mm.

Heretofore this species has been known by Erichson's name, but Say's description is so definitely of this species that there is no alternative than to use his name.

This species occurs (April–September) from Washington, D. C. to

Florida (Enterprise) west to Ohio (Cincinnati), Illinois, south to Louisiana and Arkansas; also Panama (April 9, Alhajuelo, March 14, Porto Bello). Specimens in the U.S.N.M. from Costa Rica (San Pedro de Montes de Oca) and Colombia (Medellin) probably represent a different species since the pronotal disc is more obsoletely punctate and the sulci in the hind angles of the pronotum are absent. Another specimen from Costa Rica (U.S.N.M.) is similar to *morio* but has a more convex pronotum; it is labelled *punctiventris* Sharp.

Colopterus gerhardi Dodge

Colopterus gerhardi Dodge, 1939, Ent. News, **50**, 290-291.
Type: collected Oct. 7, 1909, under sycamore bark, at Olive Branch, Illinois by W. J. Gerhard, in the Field Museum of Natural History.

Broadly oval; depressed; nearly uniform testaceous brown; the head, scutellum, outer and apical elytral margins, and oval median thoracic spot vaguely darker; antennae testaceous at base, gradually darkening to the club; moderately shining; sparsely covered with short pubescence. Head moderately punctate. Thorax 2.25 times as wide as long, sides regularly arcuately narrowed to the apex, basal margin sinuate on each side, disc with a well defined sulcus extending medianly from the basal angles and continued by a vague depression which recurves to the basal margin, surface sparsely coarsely punctate. Each elytron broadly convex when viewed from the side or behind, each apex rotundo-truncate. Length 3.5, width 2.23 mm.

The above account is condensed from Mr. Dodge's excellent description. Mr. Dodge says that *gerhardi* is related to *morio* but differs in the convex elytral outline, in this respect approaching the Mexican *inflatipennis* Sharp.

The species is known only from the holotype.

Carpophilus Stephens

Plates 3, 12

Carpophilus Stephens, 1830, Ill. British Insects, **3**, 50.
Genotype: *Dermestes hemipterus* Linn.
Tribrachys Leconte, 1861, Smiths. Misc. Coll., **1**, 83.
Genotype: *T. caudalis* = *C. decipiens* Horn.

Usually elongate, more or less depressed. Head broad but distinctly narrower than the pronotum. Clypeus indistinct, slightly porrect,

margined by a depression at each side. Eyes usually large. Antennae a little longer than the head, first segment enlarged and often widened on the outside, second and third cylindrical, about of equal length, club compact, flattened, rounded or oval in outline. Antennal grooves moderately deep and convergent. Labrum bilobed, the lobes rounded. Mandibles usually with a large tooth on the inner side, behind the apex. Lacinia broad and rounded at tip. Maxillary palpi variable, rather short and thick, first segment small, the third usually shorter than the second. Ligula with rather large laterally projecting paraglossae; the palpi robust, first segment small, the next two about of equal length. Mentum more or less transverse, not strongly emarginate. Pronotum nearly or as broad as the elytra. Scutellum usually broadly rounded posteriorly. Epipleurae narrow to broad, extending about half the length of the elytra or to the apex. Elytra abbreviated, rarely exposing three, usually two abdominal segments. Ventral segments two and three very short; one, four, and five long. Prosternal process widened and rounded posteriorly, reaching the mesosternum. Mesocoxae and metacoxae about equally separated. An additional strongly deflexed segment in the male. Legs short, tarsi dilated. Claws simple.

Carpophilus is rather closely related to both *Colastus* and the Oriental *Tetrisus*, and serves to connect the *Carpophilinae* with the *Nitidulinae*.

Species of this genus occur most commonly in flowers and at sap under bark, less commonly in decaying or dried fruit and in fungi.

Approximately 130 species of this world wide genus are known, the great majority confined to the tropics.

In such a large genus some sort of grouping of the species is necessary. Murray recognized eight subgenera, but on such variable characters that most of them seem to be useless. The only subgenera here employed are *Urophorus* and *Carpophilus* s. str. Since the species could not all be keyed in order of their relationships, the numbers after the names in the key refer to the species as they are described. No one realizes more clearly than the writer how imperfect the key is. The most trustworthy characters are to be found in the male hypopygidium and the pygidium of the female.

Key to subgenera of Nearctic CARPOPHILUS

Elytra rather short, exposing three abdominal segments. . . *Urophorus*
Elytra longer, exposing two abdominal segments. . *Carpophilus* s. str.

Subg. Urophorus Murray

Urophorus Murray, 1864, Trans. Linn. Soc. London, **24**, 342.
Subgenotype: *Ips rubripennis* Heer.

This small subgenus is cosmopolitan and is usually shining, and nearly glabrous.

Carpophilus humeralis (Fabricius)

Nitidula humeralis Fab., 1798, Ent. Syst., Suppl., p. 74.
Brachypterus picinus Boheman, 1851, Insecta Caffraria, **1**, 560.
Carpophilus foveicollis Murray, 1864, loc. cit., p. 344.
Carpophilus rickseckeri Fall, 1910, Trans. Am. Ent. Soc., **36**, 124.
Types: of *humeralis*, from Cape of Good Hope, is unknown to the writer; of *foveicollis*, from Celebes, is in the British Museum; of *picinus*, from the Limpopo River, Africa, in the National Museum, Stockholm; of *rickseckeri*, from California, in the M.C.Z. (Fall collection).

Rather broadly oblong oval; convex; sparsely pubescent; brown to black, usually a small pale spot within the humerus of each elytron, legs rufous or rufo-piceous, antennae rufous, club piceous. Upper surface strongly shining, polished, alutaceous, sometimes alutaceous only towards the sides and elytral apices. Above coarsely punctate, more sparsely so on the pronotal disc. Beneath less shining and moderately densely punctate. Prothorax slightly more than one-half wider than long, arcuately narrowed in front, subparallel basally, not at all sinuate before the hind angles, which are a little obtuse and feebly defined. Elytra as wide as prothorax, one-sixth wider than long. Additional male segment deflexed but visible from above; pygidium of female longitudinally impressed at sides. Length 3.3–4, width 1.6–1.9 mm.

A world-wide species, *humeralis* is distributed in foodstuffs, and also damages growing corn. In the United States it is known (May, June, also September to March) from Georgia (Savannah), Florida (Sanford, Enterprise, Gulfport, Brooksville), California (Indio, San Diego, Vista, Tustin), Arizona (Yuma), and Utah.

Carpophilus s. str.

1. Elytra more or less fimbriate.....2
   Elytra not at all fimbriate.....10

2. Mesosternum divided into two cells by raised spaces, between the front of which the prosternal process is accommodated.... ..... *hemipterus* (1)
   Mesosternum not so divided, simple 3
3. Under 4.2 mm. long, form more or less oval 4
   Over 4.2 mm. long, elongate, parallel 9
4. Elytra dark testaceous to black 5
   Elytra yellow-testaceous ..... *pallipennis* (2)
5. Pronotum bicolorous ..... *nigrovittatus* (3)
   Pronotum unicolorous 6
6. Pronotum rufous 8
   Pronotum piceous 7
7. Pronotum strongly convex, sides feebly arcuate ..... *floralis* (4)
   Pronotum less strongly convex, sides strongly arcuate .... *longiventris* (5)
8. Elytra piceous or black ..... *melanopterus* (6)
   Elytra rufous ..... *rufus* (7)
9. Pronotum and elytra closely fimbriate ..... *longus* (8)
   No alternate.
10. An oblique, raised line cutting off the anterior angle of the metasternum, forming the "axillary space" 24
    Oblique, raised line on metasternum absent (just indicated in *sayi*) 11
11. Less than 3.6 mm. long 19
    More than 3.6 mm. long 12
12. Length 4.5–6 mm., distinctly depressed ..... *yuccae* (9)
    Length usually less than 4.5 mm., moderately depressed 13
13. Form more oval than oblong 14
    Form more oblong than oval 15
14. Uniformly piceous to black above ..... *sayi* (10)
    Black above, each elytron with a large red spot. . *californicus* (12)
15. Color black ..... *funebris* (15)
    Color piceous 16
16. Pronotal margins lightly impressed before the posterior angles .. .. *deflexus* (14)
    Pronotal margin lacking such impressions 17
17. Abdomen rufous ..... *rufiventris* (13)
    Abdomen fuscous to piceous 18

18. Pronotum very slightly narrower at apex than at base, median impunctate pronotal line present ..... *brevipennis* (17)
Pronotum distinctly narrower at apex than at base, median impunctate pronotal line absent ..... *lugubris* 11
19. Pronotal posterior angles broadly rounded, the angle itself very small and retracted 20
Pronotal angles distinct, prominent, and not retracted 22
20. Elytra paler than the pronotum (rarely only slightly so) 21
Uniformly dark piceous or black ..... *brachypterus* (22)
21. Prosternum in front nearly smooth ..... *discoideus* (23)
Prosternum densely punctate ..... *decipiens* (24)
22. Pronotal margin broadly reflexed ..... *zuni* (25)
Pronotal margin very narrowly reflexed 23
23. Pronotum feebly convex, distinctly emarginate anteriorly ..... *corticinus* (21)
Pronotum convex, very feebly emarginate ..... *obsoletus* (16)
24. Axillary space extending about one-fifth of the episternal suture ..... *tempestivus* (26)
Axillary space extending at least one-third of the episternal suture 25
25. Axillary space extending about one-third of the episternal suture 26
Axillary space extending more than one-third of the episternal suture 27
26. Hind tibiae of male gradually widened ..... *dimidiatus* (18)
Hind tibiae of male rather abruptly widened ..... *floridanus* (19)
27. Uniform chestnut brown, convex ..... *nitens* (20)
Elytra more or less rufous, with darkened apices 28
28. Pronotum widest at the acute posterior angles ..... *marginatus* (28)
Pronotum widest at middle, hind angles obtuse ..... *antiquus* (27)

1. Carpophilus hemipterus (Linn.)

Dermestes hemipterus Linn., 1758, Syst. Nat., p. 358.
Vide Grouvelle, 1913, for full synonymy.
Type: Presumably in the collection of the Linnaean Society of London.

Oblong; feebly shining; sparsely pubescent; castaneopiceous, elytra with humeral spot and large irregular apical space testaceous, beneath rufo-testaceous. Head sparsely punctate. Prothorax one-third wider than long, sides very feebly arcuate, narrowing anteriorly, hind angles

obtuse, disc with a vague impression on each side near the base, at center moderately densely punctate, more densely towards the sides. Elytra conjointly wider than long, more finely punctate than the pronotum; abdomen above still more finely punctate. Hypopygidium simple in the male; additional segment not visible from above; middle tibiae a little stouter than in the female. A suggestion of a carina on the female pygidium. Length 2–4 mm.

This species has been carried in foodstuffs all over the world. It is particularly abundant, at all times of the year, in tropical and subtropical regions. In the United States *hemipterus* occurs as far north as Massachusetts (Boston, Brookline), Illinois, Ohio (Columbus), Kansas, Colorado (Denver) and California (Santa Cruz Mts., Fresno).

2. Carpophilus pallipennis (Say)

Plates 3, figs. 26–33; pl. 12, fig. 10

Cercus pallipennis Say, 1823, Journ. Acad. N. S. Philad., **3**, 194.

Carpophilus pallipennis var. *pollens* Sharp, 1889, Biol. Centr.-Amer., Col., **2**, 300.

Types: of *pallipennis* from eastern Colorado, near the Rocky Mountains, is lost; of *pollens*, from northern Mexico, is in the British Museum.

Oblong oval; robust; sparsely pubescent; piceous, elytra, antennae, and legs testaceous, antennal club fuscous. The parts that are piceous may be rufo-testaceous except for the metasternum, scutellum, and disc of the pronotum. Head sparsely punctate. Prothorax with width to length as 1.4 to 1, convex, narrowed in front, sides moderately arcuate, hind angles broadly rounded, surface densely punctate. Elytra conjointly with width to length as 1.2 to 1, surface regularly, densely punctate. Abdomen above more finely and sparsely punctate than the elytra. Prosternum nearly smooth. In the male the hypopygidium has a depression preceded by a bare space, the additional segment visible from above, middle and hind legs stouter than in the female. In the female a sharp point may or may not be present near the posterior margin of the pygidium. Length 2.5–4 mm.

Sharp's variety was based on a variation in the ventral depression of the male, and variations in size and color. These differences have no geographic relationships and seem to indicate no definite evolutionary tendency; so the var. *pollens* should be synonymized.

This species is abundant on the flowers of prickly pear (March–July) New York to Medicine Hat. Alberta south to Florida and Lower California into Mexico (San Pedro in Coahuila, Chihuahua City, Hidalgo).

3. Carpophilus nigrovittatus spec. nov.

Oblong, feebly shining, sparsely covered with yellow pubescence. Anterior portion of head and antennae testaceous, rest of head black; pronotum above testaceous to rufous with a median longitudinal stripe of black, about one-fourth the width of the pronotum; scutellum black; elytra black with sides and rarely a narrow posterior margin testaceous; abdomen above dark rufous to black; beneath testaceous, except that the metasternum or most of the venter may or may not be black. Prothorax with width to length as 1.5 to 1, convex, narrowed in front, sides evenly moderately arcuate, hind angles broadly rounded, surface densely, rather coarsely punctate, very finely and obsoletely granulate. Elytra conjointly with width to length as 1.2 to 1; sides evenly, feebly, but distinctly arcuate, very finely fimbriate; surface distinctly and finely granulate, as coarsely but more sparsely punctate than the pronotum. Abdomen above more finely and sparsely punctate than the elytra. Prosternum sparsely punctate. In the male the hypopygidium has a very shallow round depression preceded by a smooth space, the additional segment visible from above; legs about equally stout in both sexes. Female pygidium is moderately convex posteriorly. Length 3.7–4.2 mm.; width 1.7–1.9 mm.

This species is closely related to *pallipennis*, but is differently colored, lateral margins of elytra evenly arcuate not straight at middle, pronotum and elytra more coarsely and sparsely punctate, pronotum slightly less convex and proportionately broader.

Holotype (♂), allotype, and two paratypes from Arizona in the collection of the University of California, Berkeley. One paratype from Pyramids, Mexico, June 9, 1935 at the University of California; one paratype Pyramids, Mex. and one from Arizona in the writer's collection. One of the Mexican specimens has the elytra entirely testaceous.

4. Carpophilus floralis Erichson

Carpophilus floralis Er., 1843, in Germar, Zeitschr. für Ent., **4**, 261.
Type: from Mexico (Chevrolat) in the Berlin Museum.

Oblong oval; robust; sparsely pubescent; uniformly fuscous, the elytra and legs slightly paler. Head densely punctate. Prothorax with width to length as 7.5 to 5, convex, sides very feebly arcuate, narrowed in front, hind angles broadly rounded, surface finely granular, densely punctate. Elytra conjointly with width to length as 8.2 to 7, irregularly, sparsely punctate and finely granular. Elytral fimbriae

usually distinctly present but short. Abdomen above as coarsely but more closely punctate than the elytra. Prosternum finely, sparsely punctate. In the male a minute depression just preceding the posterior margin of the hypopygidium; additional segment visible from above. In the female the pygidium produced to a variable degree into a point preceding the hind margin. Length 2.5–3.5 mm.

This species is closely related to *pallipennis* but differs in the more convex, more coarsely and densely punctate pronotum, the more distinctly granular surface and the uniformly fuscous color. From *longiventris, floralis* differs in the more convex pronotum, less arcuate pronotal sides, and in the secondary sexual characters.

This species occurs on the flowers of prickly pear from New York (Staten Island) and New Jersey south to Florida (Key West, Enterprise, Capron) west to Kansas (Belvidere), Oklahoma (Fort Cobb), New Mexico (Wooten), and Texas (Dallas, Victoria, Denton, Arlington), south into Mexico (Mexico City, Esperanza, Jalapa, Cordova, Guanajuata). In the north *floralis* is found in June, in the south from March to August. Specimens from Brownsville, Tex. (U.S.N.M.) are aberrant in having the pronotum more coarsely punctate, the head dark piceous, disc of pronotum fuscous, and the rest rufo-testaceous.

5. Carpophilus longiventris Sharp

Carpophilus longiventris Sharp, 1889, Biol. Centr.-Amer., Col., **2**, 301.
Type: male from Ventanas, Durango, Mexico (Hoge) in the British Museum.

Oblong oval; robust; sparsely covered with long, yellow pubescence; rufo-piceous; elytra dark testaceous; antennae, legs and abdomen rufous; posternal process, mesosternum, and metasternum dark piceous. Head densely, coarsely punctate. Prothorax with width to length as 1.4 to 1, convex, sides evenly arcuate, feebly sinuate behind the hind angles so that the hind angles are just evident, surface finely granular, moderately densely punctate. Elytra conjointly with width to length as 1.1 to 1, punctate like the pronotum. Abdomen above more finely, sparsely punctate than the elytra. Prosternum very sparsely punctate. In the male the hypopygidium has a fovea at the hind margin and on each side of this a polished transverse tubercular elevation; additional segment visible from above and produced downward; hind tibiae not enlarged but more curved than in the female. In the female the pygidium is somewhat recurved and often produced into a point at or near the hind margin. Length 3.2–4 mm.

Evidently *longiventris* is closely related to *pallipennis* but the

pronotum is less convex, pronotal sides more arcuate, and the pronotal punctuation more sparse. The best difference is in the male hypopygidium. One female from Oak Creek, Arizona (Kansas Univ. coll.) is aberrant in being darker, more coarsely and densely punctate, and pronotal sides less arcuate. A male from Texas (U.S.N.M.) differs in having less arcuate pronotal sides, the hypopygidium more simple, and the eighth segment not produced downward.

Aside from the type locality in Mexico, *longiventris* has been collected on *Yucca elata* (April–August) in Lower California, "Cal.", Arizona (Pinal Mts., Catalina Springs, Santa Rita Mts., Huachuca Mts., Chiricahua Mts.) and the aberrant specimen from Texas.

6. Carpophilus melanopterus Erichson

Carpophilus melanopterus Er., 1843, in Germar, Zeitschr. für Ent., **4**, 262.
Type: from South Carolina (Zimmermann) in the Berlin Museum.

Oblong oval; sparsely covered with fine pubescence; bright rufous except for piceous or black elytra and black antennal club. Head and pronotum densely, variolosely punctate. Prothorax with width to length as 1.8 to 1, sides very feebly arcuate, narrowing anteriorly, abruptly sinuate before the hind angles and sinuate behind the hind angles. Elytra conjointly a little wider than long, broadening posteriorly, humeri and apices sometimes rufescent, more densely and finely punctate than the pronotum. Dorsal segments more sparsely punctate than the elytra. Prosternum finely punctate. In the male a large, vague, semicircular impression before the hind margin of the hypopygidium; additional segment not visible from above. In the female a blunt carina on the pygidium. Length 3.2–4.5 mm.

This species occurs in the flowers of *Yucca* (May–July) from New York (Rye), New Jersey (Bergenfield), and Illinois to Florida, west to Iowa (Lee Co.), Texas (Dallas), south into Mexico.

7. Carpophilus rufus Murray

Carpophilus rufus Murray, 1864, Trans. Linn. Soc. London, **24**, 371.
Type: from Mexico in the Paris Museum.

This species is usually considered a variety of *melanopterus*. It is similar to that species, but averages larger, the elytra are rufous, the pronotum somewhat more finely and sparsely punctate, the antennal club fuscous not black, and the underside entirely rufous. Length 4–5 mm. Also the pronotum and sutural margins of the elytra tend to

become fuscous and the elytra to become testaceous. This tendency is similar to that which is achieved in *pallipennis*. Dodge (Ent. News, 50: 291) indicates an ecological differentiation between *melanopterus* and *rufus* by stating that *rufus* is found on cactus blossoms whereas *melanopterus* occurs on flowers of yucca. There is, however, one specimen from Dallas, Texas (U.S.N.M.) colored like *melanopterus* and recorded from *Yucca*, but punctate like *rufus;* so perhaps *rufus* should be placed as a subspecies of *melanopterus*.

This species occurs on the flowers of prickly pear (*Opuntia*) from May to July, South Dakota (Rapid City) through Kansas (Reno Co., Medora, Rago), Nebraska (Pine Ridge, Meadville), Utah (Arch Canyon), Oklahoma (Texas Co., Noble Co.), Colorado (Denver, Las Animas), "Cal.", New Mexico (Moses), Texas (Dallas), into Mexico (Vera Cruz, Jicaltepec).

8. Carpophilus longus Fall

Carpophilus longus Fall, 1910, Trans. Amer. Ent. Soc., **36**, 123.
Type: collected June 6, 1891, Santa Rita Mts., Arizona in the M.C.Z. (Fall collection).

Elongate; parallel; convex; sparsely pubescent; piceous; antennae, legs, abdomen beneath, and usually the elytra dark rufous. Head and pronotum densely punctate, elytra more finely and less densely punctate than the pronotum, and the abdomen more finely and less densely punctate than the elytra. Prothorax with width to length as 1.4 to 1, sides very feebly arcuate, very slightly narrowed in front, hind angles broadly rounded. Prosternum obsoletely punctate. In the male the hypopygidium is simple; the additional segment not visible from above. In the female there is a vague suggestion of a carina on the pygidium. Length 4.2–5, width 1.5–1.8 mm.

This species has been collected (April–June) in leaves of *Yucca macrocarpa* only in southern Arizona (Santa Catalina Mts., Santa Rita Mts., Chiricahua Mts.).

9. Carpophilus yuccae (Crotch)

Colastus yuccae Crotch, 1874, Trans. Amer. Ent. Soc., **5**, 75.
Type: from the unopened flower heads of *Yucca* in the Mohave Desert, California in the M.C.Z. (Leconte collection).

Oblong oval; depressed, sparsely covered with fine pubescence, uniformly dark piceous, sometimes rufo-piceous. Head and pronotum

densely punctate. Prothorax with width to length as 1.6 to 1, sides moderately arcuate, slightly narrowed in front, hind angles broadly rounded, the angle itself very small due to a slight sinuation just preceding and behind it. Elytra and dorsal segments more finely punctate than the pronotum. In the male the hypopygidium is simple; the additional segment not visible from above. In the female the pygidium is feebly, bluntly carinate. Length 4.5–6.2, width 2–2.5 mm.

This species is remarkable for its large size and oval, depressed form.

This species occurs in the flowers of *Yucca* (April–July) from Texas (Rivers collector), through New Mexico (Sacramento Mts., Alamogordo), Arizona (Chiricahua Mts., Santa Rita Mts., Santa Catalina Mts.), to California (Mohave Desert, Los Angeles Co., Argus Mts., Onyx, March 13).

10. Carpophilus sayi spec. nov.

Carpophilus niger (Say) of authors, in error = *Colastus niger* (Say).

Holotype (♂) and allotype from Bear Lake, Warren County, Pennsylvania in the collection of the author. Paratypes from New York to Virginia west to Illinois in the author's collection.

Oval, slightly oblong, subopaque, sparsely pubescent, dark piceous, legs and antennae (except club) dark rufous, pronotal margins and humeri often rufous. There is a tendency for the humeri and margins of the pronotum to be paler. Head very densely punctate. Prothorax with width to length as 1.5 to 1, sides moderately arcuate, narrowed in front, margins bluntly crenulate, hind angles moderately prominent, hind margin sinuate on each side, disc slightly flattened, a feeble oblique impression on each side of the scutellum, surface densely, variosely punctate. A narrow smooth median line on the posterior half of the pronotum. Elytra conjointly with width to length as 1.2 to 1, slightly narrowed posteriorly, disc slightly flattened, surface a little more sparsely punctate than the pronotum. Abdomen much more finely punctate than the elytra. Prosternum densely punctate. In the male a large, vague, shallow depression on each side, before the hind margin of the hypopygidium (these depressions may be moderately deep and connected); additional segment not visible from above. The female with a distinct, blunt carina on the pygidium. Length 3–4.5 mm.

This species is closely related to *lugubris*, but differs in being more oval, darker, and shallower foveae on the male hypopygidium. A female from Albuquerque, New Mexico (writer's coll.) is evidently this species.

This species occurs (April–October) from Quebec to Georgia, west to Texas (Dallas), Iowa (Mt. Pleasant), and Manitoba (Aweme); also New Mexico (Albuquerque).

11. Carpophilus lugubris Murray

Carpophilus lugubris Murray, 1864, Trans. Linn. Soc. London, **24**, 355.
Types: from Caracas, Venezuela and Florida in the British Museum.

Oblong oval; moderately convex; sparsely pubescent; uniformly fuscous (rarely black with paler elytra) except for rufescent elytral humeri and dark piceous antennal clubs. Head and pronotum rather coarsely, very densely punctate. Prothorax with width to length as 1.5 to 1; sides moderately arcuate, slightly narrowed in front, margins narrowly reflexed; sinuate before and behind the moderately prominent hind angles. Elytra conjointly with width to length as 1.1 to 1, densely, very shallowly punctate. Dorsal segments more finely, sparsely punctate than the elytra. Prosternum densely obsoletely punctate. In the male two deep, circular, depressions on the hypopygidium; additional segment not visible from above. In the female the pygidium is more or less bluntly carinate, the carina shining and tuberculiform at its apex. Length 3–4.5 mm.

This species is very near *sayi* but more parallel, paler, and has different male characters. Some specimens from Virginia, Pennsylvania, Ohio, and Illinois seem to be intermediate between *sayi* and *lugubris*, but are here treated as *sayi*.

This species occurs (June-October) from Brazil through Middle America to Arizona (Globe, Huachuca Mts., Duncan, Cornville), New Mexico (Las Vegas Hot Sprgs., Jemez Mts., Taos Co., Albuquerque), Texas (Cypress Mills), Utah (Green River), "W.T." (A.N.S.P.), Colorado (Masonville, Colorado Springs, Denver), Kansas, and Iowa; also Black Mts., N. C.

12. Carpophilus californicus Schaeffer

Carpophilus californicus Schaeffer, 1911, Journ. N. Y. Ent. Soc., **19**, 115.
Type: from Tulare County, California (O. Dietz) in the U.S.N.M.

Very closely related to *sayi* but differing in having narrower pronotal margins, pronotal disc not so evidently flattened, pronotum usually darker, elytra bright rufous with suture, apices, and lateral margins piceous or black, and a more or less deep transverse depression preceding the hind margin of the pygidium, and the pygidium bluntly

carinate in the female. Male hypopygidium with a crescentic, shallow depression before the hind margin. Length 3.5–4.5 mm.

Although usually distinguished by the large, bright rufous elytral spots, some specimens in the U.S.N.M. from Wash. Terr. and California (Santa Cruz Mts., Los Gatos) have the rufous spots obsolete and only shown clearly by large humeral spots.

This species occurs (June-August) in Wash. Terr., California (Tulare Co., Kaweah, Madera Co., Sylvania, Los Gatos, Santa Cruz Mts., Los Angeles Co.), Arizona (Huachuca Mts., Tucson, McNary, 7200 ft.) and Texas (Brewster Co.).

13. Carpophilus rufiventris Schaeffer

Carpophilus rufiventris Schaeffer, 1911, Journ. N. Y. Ent. Soc., **19**, 116.
Type: from the Huachuca Mts., Arizona in the Cornell Univ. Coll.

Elongate oval, depressed, covered with rather dark pubescence, piceous or black, underneath rufous, legs and antennae paler. Head rather coarsely, closely punctate. Prothorax with basal and apical margin nearly equal, sides feebly arcuate, anterior angles broadly rounded, basal angles distinct, punctures on the disc distinctly separated. Elytra more sparsely punctate than the pronotum. Dorsal segments more finely and densely punctate than the elytra. In the male the hypopygidium is simple; the additional segment not visible from above. Length 5–5.5 mm.

Known only from the Huachuca Mts., Arizona.

14. Carpophilus deflexus Sharp

Carpophilus deflexus Sharp, 1899, Biol. Centr.-Amer., Col., **2**, 290. Schaeffer, 1911, Journ. N. Y. Ent. Soc., **19**, 118.
Types: from Mexico (Hoge) and Guatemala (Champion) in the British Museum.

Moderately depressed; strongly punctate; nigroferrugineous; humeri feet, and antennae rufous, antennal club fuscous. The margin of the pronotum is lightly impressed before the posterior angles. In the male a single broad depression on the middle of the hypopygidium; basal half of the middle tibiae much slenderer than the apical half. In the female the pygidium is slightly convex toward the apex. Length 4–4.5 mm.

Sharp states that *deflexus* can be separated from *lugubris* by the unusually coarse punctation, the depression on the pronotal margins,

and the peculiar middle tibiae of the male. Also *lugubris* is less convex than *deflexus*.

This species, known to the writer only by the types, was described from Mirador, Mexico and Cerro Zunil and Dueñas, Guatemala. Schaeffer doubtfully referred two females (now in Cornell Univ. coll.) from the Huachuca Mts., Arizona to this species.

15. Carpophilus funebris Sharp

Carpophilus funebris Sharp, 1889, Biol. Centr.-Amer., Col., **2**, 288; pl. 9, fig. 10.
Types: from Guatemala and Panama (Champion) in the British Museum.

Oblong, feebly convex, very sparsely and finely pubescent, uniformly black, except that the antennae and feet are piceous, antennal club darker. Head and pronotum densely, rugosely punctate. Prothorax with width to length as 1.9 to 1, sides moderately arcuate, slightly narrowed anteriorly, margins very narrowly reflexed, sinuate before and behind the small hind angle. Elytra conjointly as wide as long, shallowly, variosely punctate. Dorsal segments more finely and much more sparsely punctate than the elytra. Prosternum densely, rugosely punctate. In the male a vague, shallow depression on each side, near the hind margin of the hypopygidium. In the female the pygidium is carinate.

The types are from Cerro Zunil, Guatemala and Volcan de Chiriqui, Panama. Sharp also mentions atypical specimens from Mexico. The above description is based on a single male collected July 15, 1938, Santa Catalina Mts., Arizona in the M.C.Z. (Fall collection).

16. Carpophilus obsoletus Erichson

Carpophilus obsoletus Er., 1843, in Germar, Zeitschr. für Ent., **4**, 259.
Carpophilus cribellatus Motsch., 1858, Étud. Ent., **7**, 41.
Carpophilus strigipennis Motsch., 1858, Étud. Ent., **7**, 41.
Carpophilus funereus Reitt., 1884, Nitid. Japans, p. 259.
Types: of *obsoletus* in the Berlin Museum, of *cribellatus* from East Africa and Corsica and of *strigipennis* from Ceylon and Siam both presumably in the Zoöl. Mus., Univ. of Moscow, of *funereus* from Japan presumably in the National Museum in Budapest.

Oblong oval, convex, sparsely covered with long cinereous, rarely testaceous, pubescence. Occasionally all black above, or piceous, usually black with elytra dark piceous and the humeral umbone pale. Antennae and legs fuscous, the legs often becoming testaceous towards the extremities. Antennal club piceous. Head densely, rather coarsely

punctate, finely alutaceous. Prothorax with width to length as 1.5 to 1, apex very feebly emarginate, sides feebly arcuate, slightly narrowed in front, densely punctate at center and very densely, more coarsely, rugosely punctate at the sides; finely alutaceous; a large vague depression near the hind angles but not near the margin. Hind angles variably subrectangular. Scutellum pentagonal. Elytra conjointly with width to length as 1.3 to 1, slightly longer than the pronotum, about as coarsely but more densely punctate than pronotum at center, punctures becoming obsolete apically and rugose at margin. Prosternum densely punctate, prosternal process carinate. Male hypopygidium simple or with two vague foveae. Male and female pygidium simple or variably acuminate and reflexed. Length 2.5–3.5 mm.

Like most widespread species *obsoletus* varies greatly in secondary sexual characters, punctation, convexity, proportions, etc.

This species occurs in Madagascar, Corsica, China, Japan, and the Oriental region, and apparently is recently introduced into the United States where it is found in California (Indio, M.C.Z.: Fall collection; Castro Valley, Feb. 27, 1938, in the Univ. of Calif. coll. and writer's coll.). These agree with specimens from China in the writer's collection.

17. Carpophilus brevipennis (Blanchard)

Nitidula brevipennis Blanchard, 1842, Voy. d'Orbigny, Am. mer. Ins., p. 64.
Carpophilus lacertosus Murray, 1864, Trans. Linn. Soc. London, **24**, 354.
Carpophilus purpureipennis Murray, 1864, Trans. Linn. Soc. London, **24**, 354, 396.
Carpophilus ignobilis Fall, 1910, Trans. Amer. Ent. Soc., **36**, 124.
Types: of *brevipennis* from Arica, Peru presumably at Paris, of *lacertosus* and *purpureipennis* both from Venezuela in the British Museum, of *ignobilis* from the Santa Rita Mts., Arizona in the M.C.Z. (Fall collection).

Moderately elongate oval, subdepressed, sparsely pubescent, castaneo-piceous, legs and antennae, except club, paler. Head coarsely, moderately densely punctate. Prothorax with width to length as 1.4 to 1, sides evenly feebly arcuate, very slightly narrowed in front, margins very narrow, hind margin sinuate on each side behind the moderately prominent hind angles, punctation rather coarse and dense, the punctures on the disc usually separated by less than their diameters, disc with a very narrow, median, impunctate line on basal half. Elytra conjointly with width to length as 1.1 to 1, punctate about as the pronotum. Dorsal segments much more finely punctate than the elytra. In the male the hypopygidium is simple, the additional segment not visible from above. The female pygidium is very bluntly carinate

and the lateral margins more or less reflexed. Length 3.5, width 1.6 mm.

This species is perhaps most closely related to *lugubris* but is more depressed and parallel. It also tends to approach *californicus*, but the latter is larger, more convex, and more coarsely punctate. In the Fall coll. (M.C.Z.) are specimens from the Huachuca Mts., Arizona with rufous elytra.

This species is found in *Yucca macrocarpa* and *Agave palmeri* (May-July) in Arizona (Oracle, Tucson, Santa Rita Mts., 5-8000 ft., Huachuca Mts.), New Mexico, Texas, through Mexico, Guatemala (Capetillo), Venezuela, to Peru and Brazil.

18. Carpophilus dimidiatus (Fabricius)

Nitidula dimidiatus Fabr., 1792, Ent. Syst., **1**, 261.
Carpophilus luridus Murray, 1864, Trans. Linn. Soc. London, **24**, 377.
Carpophilus mutilatus Erichson, 1843, in Germar, Zeitschr. für Ent., **4**, 258.
For complete synonymy see Grouvelle, 1913.
Types: of *dimidiatus*, from the West Indies, possibly at Kiel; of *luridus* from Europe, North America, South America, East Indies, Ceylon in the British Museum; of *mutilatus* from Brazil, West Indies, Portugal, Sicily in the Berlin Museum.

Oblong, convex, surface finely granular, feebly shining, sparsely pubescent; color varying from piceous to testaceous with the elytra always paler. Head rather densely, coarsely punctate, clypeus much more sparsely, finely punctate. Prothorax with width to length as 1.5 to 1, sides very feebly arcuate, narrowed in front, hind angles obtuse not prominent, surface sparsely, coarsely punctate. Elytra conjointly a little longer than wide, as sparsely but much more finely punctate than the pronotum. Prosternum densely punctate. In the male the hypopygidium is simple, the additional segment not visible from above. Pygidium simple in the female. Length 2—3.5 mm.

The above description is of typical *dimidiatus*. The species is so variable that a number of variations or possible distinct species have been described. The form *mutilatus* is larger and narrower, more finely and shallowly punctate; the form *luridus* has the prothorax more quadrate than in *mutilatus* and approaches *dimidiatus* in punctation. Since all three forms are cosmopolitan and intergrade, it seems best to make them all one variable species.

This species occurs in all tropical and temperate parts of the world. In the United States *dimidiatus* is found at all times of the year from Quebec to Florida west through Texas and Kansas to California (as far north as Redlands).

19. Carpophilus floridanus Fall

Carpophilus floridanus Fall, 1910, Trans. Amer. Ent. Soc., **36**, 122.
Type: from Enterprise, Florida in the M.C.Z. (Fall collection).

Closely related to *dimidiatus*, but the head, prothorax, and elytra concolorous (rarely the elytra more pale), brown; dorsal surface of the abdomen and sometimes the metasternum darker. Also differs from *dimidiatus* in finer punctation, slightly stouter legs, the hind tibiae of the male subcylindrical for a short distance at base, then rather abruptly widening, the inner outline arcuate. Length 2—2.5 mm.

This species is easily distinguished from *dimidiatus* by the male hind tibiae.

This species is known (April-October) in South Carolina (Yenassea), Florida (Enterprise, Sanford, Marathon), and Alabama (Mobile).

20. Carpophilus nitens Fall

Carpophilus nitens Fall, 1910, Trans. Amer. Ent. Soc., **36**, 125.
Type: from Mobile, Alabama (H. P. Loding) in the M.C.Z. (Fall collection).

Oblong, subovate, moderately convex, surface shining, sparsely pubescent; piceous brown, beneath paler. Head moderately punctate. Prothorax with width to length as 1.5 to 1, subparallel basally, sides arcuately narrowed in front, hind angles well defined, surface coarsely, sparsely punctate, with a median, basal, impunctate line. Posterior half of scutellum impunctate. Elytra conjointly with width to length as 1.1 to 1, a little more finely punctate than the pronotum and the punctures becoming obsolete at the apices. Prosternum densely coarsely punctate. In the male the hypopygidium is simple, the additional segment almost visible from above. The pygidium is simple in the female. Length 2.7–3 mm.

This species occurs (April-June, Sept.-March) from New Jersey (Avenel, Lakehurst) and Ohio (Columbus) to Georgia (Tybee Isl., Millidgeville in *Ergot*), west through Alabama (Mobile), to California (Santa Barbara, Santa Ana, Fresno, north to Alameda Co.).

21. Carpophilus marginatus Erichson

Carpophilus marginatus Er., 1843, in Germar, Zeitschr. für Ent., **4**, 262.
Type: from North Carolina (Zimmermann) in the Berlin Museum.

Oval, slightly oblong, sides of prothorax and elytra continuous, finely sparsely pubescent, moderately shining, rufous or rufo-piceous, pos-

terior fourth of elytra and sometimes the sutural margins somewhat darker. Head rather finely, densely punctate. Prothorax with width to length as 1.8 to 1, sides straight, arcuately narrowed in front, widest at the rectangular hind angles, surface densely punctate. Scutellum pentagonal. Elytra conjointly with width to length as 1.2 to 1, narrowed posteriorly, apices squarely truncate, more densely, obsoletely punctate than the pronotum. Prosternum sparsely punctate. In the male the hypopygidium is simple, the additional segment not visible from above. The female pygidium often has a faint suggestion of a carina. Length 1.5–2 mm.

The peculiar outline and very small size distinguishes *marginatus*.

This species occurs on freshly cut oak (May-November, chiefly July) from "Poughkeepsie" (N. Y. State List), and New Jersey (Camden), to Florida, west to Alabama (Tuskegee), north to Michigan (Detroit) and Lake Superior; also Oregon (Leconte coll.).

22. Carpophilus corticinus Erichson

Carpophilus corticinus Er., 1843, in Germar, Zeitschr. für Ent., **4**, 263.
Type: from eastern United States (Knoch) in the Berlin Museum.

Oval, slightly oblong, subdepressed, feebly shining, sparsely pubescent, castaneo-piceous, rarely dark piceous, legs rufo-piceous, antennal club fuscous. Head and pronotum moderately densely, finely punctate. Prothorax with width to length as 1.6 to 1, as broad at base as at apex, sides broadly arcuate, margins rather broadly reflexed, hind angles subrectangular. Elytra conjointly a little wider than long, punctate as in the pronotum but with the interstices more granular. Prosternum densely punctate. In the male the hypopygidium is deeply emarginate for the additional segment, which is nearly visible from above. Length 2.8–3.4 mm.

Most closely related to *brachypterus*, *corticinus* differs in being larger, more depressed, and in the differently shaped pronotum.

This species occurs (April-Sept., chiefly June) from New York (Harrison), New Jersey (Fort Lee), and Ohio (Cincinnati) to Georgia, west to Texas, north to Michigan (Detroit, Gd. Ledge).

23. Carpophilus brachypterus (Say)

Nitidula brachypterus Say, 1825, Journ. Acad. N. S. Philad., **5**, 183.
Carpophilus carbonatus Leconte, 1859, Smiths. Contr. Knowl., p. 6.
Types: of *brachypterus* from eastern United States is lost, of *carbonatus* from Nebraska and Lake Superior in the M.C.Z. (Leconte collection).

Oblong oval, subdepressed, surface finely granular, very sparsely pubescent, piceous to black. Head and pronotum sparsely punctate. Prothorax with width to length as 1.6 to 1; apex and base equal, sides moderately arcuate, hind angles small but distinct. Elytra conjointly with width to length as 1 to 1.1, apices strongly truncate, face more finely, sparsely punctate than the pronotum. Prosternum nearly smooth. In the male the hypopygidium is not emarginate, but the additional segment is not visible from above. Length 1.8—2.5 mm.

This species occurs (April-August) from Ontario (Prince Edward Co.) and Quebec (Rigaud) to North Carolina (Southern Pines, March 26), west to Texas, Nebraska (Lincoln), Kansas (Douglas Co., Benedict, Onaga), Iowa (Mt. Pleasant), South Dakota (Sioux Falls) and White Fish Point, Lake Superior.

24. Carpophilus discoideus Leconte

Carpophilus discoideus Lec., 1858, Proc. Acad. N. S. Philadelphia, **10**, 62.
Carpophilus apicalis Lec., 1859, Smiths, Contr. Knowl., p. 6.
Tribrachys caudalis Lec., 1859, Proc. Acad. N. S. Philadelphia, **11**, 70.
Types: of *discoideus* (no. 6963) from Arizona; of *apicalis* from Georgia and Nebraska; of *caudalis* (no. 6964) from Nebraska are all in the M.C.Z. (Leconte collection).

Oval, slightly oblong, subdepressed, sparsely pubescent; rufo-piceous to piceous, legs paler, each elyton with a large pale discal spot. Head and pronotum moderately sparsely punctate. Prothorax with width to length as 1.7 to 1; apex and base equal, sides moderately arcuate, hind angles small but distinct. Elytra conjointly as wide as long, punctate like the pronotum, but more obsoletely punctate toward the apices. Prosternum smooth or nearly smooth. Male hypopygidium simple but deeply emarginate for the additional segment. Female pygidium deflexed at apex, so that it appears truncate from above. Length 2.2-3 mm.

Evidently closely related to *decipiens*, *discoideus* differs in being usually darker, smaller, less depressed, and narrower. But the key character and the female pygidium seem to offer the only dependable differences.

This species occurs (April-August) in Washington, California (Los Gatos, Santa Cruz Mts., Sisson, Sylvania, Pomona, Imperial Co.), Wyoming (Nat. Park), Nevada (Reno), Arizona (Ft. Yuma, Santa Rita Mts.), Utah (Uinta Co.), Colorado (Telluride), New Mexico (Gallup, Silver City, Albuquerque), Texas, Nebraska, Michigan (Port

Huron) and Lake Superior; also "Ill." (A.N.S.P.), "Geo." (Leconte coll.) and "Mass." (A.N.S.P.).

25. Carpophilus decipiens Horn

Carpophilus decipiens Horn, 1879, Trans. Amer. Ent. Soc., **7**, 279.

Types: from Tejon, California, Arizona, and Lower California. Cotypes in M.C.Z. (Leconte collection) and Philad. Acad. Nat. Sci. (Horn collection).

Oblong oval, depressed, sparsely pubescent, piceous, elytra and legs paler. Head and pronotum sparsely, rather coarsely punctate. Prothorax with width to length as 1.5 to 1, base very slightly narrower than the apex, sides moderately arcuate, slightly sinuate posteriorly, hind angles distinct but slightly retracted, disc flat. Elytra conjointly very little longer than wide, more granular and more finely, sparsely punctate that the pronotum. Prosternum densely punctate. In the male the hypopygidium is deeply emarginate for the additional segment, which is nearly visible from above. Female pygidium not truncate at apex. Length 2.4–3.5 mm.

This species occurs (March-Nov., Jan., chiefly July) from Alaska (Nome), through Canada to California (Castro Valley, Alameda Co., Santa Clara Co., Canta Cruz Co., Fresno Co., Pomona, Los Angeles, San Bernardino Mts., 6000 ft.), east through Arizona (Williams, Pinal Mts., Tucson, Huachuca Mts.), New Mexico (Albuquerque) and Texas (Chisos Mts.) to Nebraska and Louisiana (Opelousas).

26. Carpophilus zuni Casey

Carpophilus zuni Casey, 1884, Contr. Coleopt. N. A., pt. 1, p. 34.

Type: from Arizona (Morrison) in the U.S.N.M. (Casey collection). Evidently this specimen came from the Leconte collection because there is in that collection (apparently substituted) an *Epuraea* labelled "*zuni* type" in Casey's handwriting.

Elongate, depressed, pubescence sparse and very fine; piceo-castaneous, beneath rufous, including the legs and antennae. Head minutely punctulate and rugulose. Prothorax one-half wider than long, width at base and apex equal, sides arcuate, strongly sinuate before the hind angles, margins broadly reflexed (rarely moderately so), surface minutely and very closely punctulate. In both sexes the pygidium has three strong posteriorly convergent carina. Length 3.1 mm.

This species resembles an *Epuraea* and is remarkable in the broadly reflexed pronotal margins and the singular pygidium.

A rare species, *zuni* occurs (July 9-August 17) in Arizona (Williams) and New Mexico (Beulah, Albuquerque).

27. Carpophilus tempestivus Erichson

Carpophilus tempestivus Er., 1843, in Germar, Zeitschr. für Ent., **4**, 260.
Carpophilus tempestivus var. *terminatus* Murray, 1864, Trans. Linn. Soc. London, **24**, 389.
Types: both from Cuba (Gundlach) in the Berlin Museum.

Oblong, moderately elongate, finely granular, moderately convex, shining, very finely and sparsely pubescent, pale rufous, suture and apices of elytra often narrowly piceous, antennal club sometimes darker. Prothorax with width to length as 1.4 to 1, sides feebly arcuate, sinuate before the hind angles, which are small and retracted, surface sparsely punctate. Elytra conjointly a little longer than wide, more sparsely punctate than the pronotum. Prosternum very sparsely punctate. In the male the hypopygidium is simple, the additional segment not visible from above. In the female the pygidium is bluntly carinate. Length 1.7–2.5 mm.

Murray described the variety *terminatus* for those specimens with only the elytral apices piceous; a variation so slight that it cannot be dignified with a name.

This species occurs throughout the year from Georgia to Florida (Enterprise, Haulover, Lake Harney, Indian River, St. Lucie, Biscayne Bay), west to Louisiana (Lake Mary, Winnfield) and Arkansas (Hot Springs); also in the West Indies (Cuba, Porto Rico, Montserrat).

28. Carpophilus antiquus Melsheimer

Carpophilus antiquus Melsh., 1844, Proc. Acad. N. S. Philadelphia, **2**, 105.
Type: from Pennsylvania in the M.C.Z. (Melsheimer collection).

Oblong, moderately convex, surface finely granular, moderately shining, very sparsely, very finely pubescent; rufous to rufo-piceous, paler beneath, at least the apical fourth of elytra always piceous. Head and pronotum sparsely, rather coarsely punctate. Prothorax with width to length as 1.7 to 1, base and apex of equal length, sides feebly arcuate, hind angles subrectangular. Scutellum mostly impunctate. Elytra conjointly as wide as long, a little more coarsely and sparsely punctate than the pronotum. Prosternum at middle very sparsely

punctate. In the male the hypopygidium is simple, the additional segment not visible from above, and the pygidium reflexed at apex. The female pygidium is simple. Length 2–3 mm.

This species occurs (April-September) from "Can." (A.N.S.P.), Massachusetts (Sagamore), and New York (Flatbush), to Florida (Atlantic Beach), west to Texas, Missouri (Webster Groves, St. Charles), Kansas (Neosho Co.), and Iowa (Mt. Pleasant).

NITIDULINAE

Nitidulinae Er., 1843, in Germar, Zeitschr. für Ent., **4**, 226.

This subfamily grades imperceptibly into Carpophilinae, so that the differences seem superficial. The Nitidulinae are more heterogeneous than the other subfamilies and probably should be subdivided. In the following key the genera could not be placed in the order of their relationships. Since they are described in their natural order, the numbers after the genera in the key refer to this arrangement.

Key to genera of Nearctic Nitidulinae

1. Prothorax not margined at base; head horizontal 2
   Prothorax margined at base; head vertical 15
2. Prosternum depressed behind the coxae, not prolonged 3
   Prosternum elevated behind, often prolonged 12
3. All tarsi very distinctly dilated 4
   Tarsi not dilated, or but feebly so 7
4. Antennal grooves strongly convergent 5
   Antennal grooves parallel, passing directly backwards . . . . . *Stelidota* (4)
5. Labrum bilobed 6
   Labrum feebly emarginate . . . . . *Nitidula* (6)
6. Posterior tibiae of the male slightly arcuate, slender at basal half, suddenly broadened apically (not true of all exotic species); middle tibiae slender, similar in both sexes . . . . . *Haptoncus* (1)
   Posterior tibiae of both sexes slender, similar, or the middle tibiae dissimilar, that of the male being sinuate within and thickened at tip . . . . . *Epuraea* (2)
7. Mentum broad, covering the base of the maxillae. *Prometopia* (7)
   Mentum not covering the maxillae 8

8. Front not lobed over the antennae....9
Front lobed over the insertion of the antennae....10
9. Tip of mandibles slightly bifid....*Phenolia* (10)
Tip of mandibles not bifid....*Omosita* (5)
10. Antennal grooves strongly convergent behind....*Soronia* (9)
Antennal grooves parallel....11
11. Elytra not, or merely apparently costate....*Lobiopa* (8)
Elytra distinctly costate....*Amphotis* (11)
12. Head without antennal grooves....13
Head with distinct antennal grooves....14
13. Anterior tibia bidentate at middle....*Perthalycra* (13)
Anterior tibia not toothed externally....*Thalycra* (12)
Anterior tibia with outer apical angle greatly prolonged in the form of a large triangular tooth....*Quadrifrons* (14)
14. Tarsi not dilated; body oval, pubescent....*Pocadius* (15)
Front tarsi dilated; body parallel and glabrous...*Orthopeplus* (3)
15. Mesosternum protuberant in front; middle coxae widely separated....16
Mesosternum small, oblique, not protuberant....18
16. Prosternum prolonged, broadly dilated at tip; body glabrous..17
Prosternum less prolonged, feebly dilated at tip, body pubescent....*Amphicrossus* (17)
17. Labrum deeply bilobed; hind tarsi longer than middle....*Oxycnemus* (21)
Labrum feebly bilobed, hind and middle tarsi of equal length....*Camptodes* (16)
18. Metasternum not protuberant; middle coxae narrowly separated....19
Metasternum protuberant, widely separating the middle coxae; prosternum not prolonged at tip....*Cyllodes* (20)
19. Hind tarsi longer than the others; body glabrous...*Pallodes* (19)
Hind tarsi equal to the others; body pubescent...*Cychramus* (18)

1. Haptoncus Murray

Plates 4, 12

Haptoncus Murray, 1864, Trans. Linn. Soc. London, **24**, 401.
Genotype: *Haptoncus tetragonus* Murr. = *Haptoncus ocularis* (Fairm.).
Haptoncura Reitter, 1875, Verh. Nat. Ver. Brünn., **13**, 61 et 64.
Genotype: *Epuraea luteola* Er.

Body small, slightly convex. Head broad, clypeus indistinct, slightly porrect. Antennae a little longer than the head, first segment enlarged on the outside, second convex as long as the third, club large, oval, pubescent. Antennal grooves short, convergent. Labrum long, deeply bilobed. Mandibles strongly or feebly bidentate. Lacinia broad and rounded at tip, heavily bearded. Maxillary palpi with first segment small, second much larger and clavate, third smaller than the second, fourth cylindrical and much longer than the second. Ligula with rather large laterally projecting paraglossae, the palpi with first two segments small, the third greatly enlarged. Mentum transverse, more or less emarginate in front. Pronotum as broad as the elytra. Scutellum not round posteriorly. Epipleurae broad and attaining the elytral apices. Elytra long, the pygidium and penultimate segment ordinarily visible from behind, but not from above. Prosternal process widened and rounded posteriorly, sometimes reaching the metasternum. Mesocoxae a little further apart than the procoxae; the metacoxae about twice as far apart as the mesocoxae. In the male there is an additional segment, behind the pygidium, which is visible from above. Femurs canaliculate, tarsi feebly dilated, front tarsi more strongly dilated. Claws simple.

This genus connects the Nitidulinae with the Carpophilinae. It is very similar to *Carpophilus*, but differs in the longer elytra, different labial palpi, and the undeflexed eighth abdominal segment of the male.

Haptoncus contains 34 species. Except for one Brazilian species and the tropicopolitan *luteolus*, the genus is Old World.

Haptoncus luteolus (Erichson)

Plates 4, figs. 1–8; pl. 12, fig. 11

Epuraea luteola Er., 1843, in Germar, Zeitschr. für Ent., **4**, 272.
Epuraea texana Crotch, 1874, Trans. Amer. Ent. Soc., **3**, 76.
For complete synonymy see Grouvelle, 1913.
Types: of *luteolus* from Cuba (Otto) in the Berlin Museum; of *texana* from Texas, no. 8310 in the M.C.Z. (Leconte coll.).

Oval, slightly oblong, moderately shining, sparsely pubescent; uniformly testaceous, except for the black eyes and fulvous antennal club. Head finely, sparsely punctate. Prothorax with width to length as 1.9 to 1, sides feebly arcuate, narrowing anteriorly, margins narrowly reflexed, hind angles rectangular, surface rather finely, densely punctate. Elytra a little longer than wide, narrowed posteriorly, apices truncate, surface a little more sparsely and coarsely punctate than the pronotum. Middle tibiae simple in both sexes. In the male the

posterior tibiae have the basal two-fifths slender and the apical portion suddenly about twice as wide; the additional segment is acutely rounded. Length 2–2.5 mm.

A tropicopolitan species, *luteolus* occurs throughout the year in the United States from California (Elsinore Lake, Pasadena, Tustin, Vista), Arizona (Yuma), Texas (Fedor), Alabama (Mobile), to Florida (many localities); also Tennessee, Ohio (Columbus) and New Jersey (Hopatcong). The recent northern records indicate that *luteolus* is being spread by human agency.

2. Epuraea Erichson

Plates 4, 12

Epuraea Er., 1843, in Germar, Zeitschr. für Ent., **4**, 267.
Dadopora C. G. Thoms., Skand. Col., 1859, 1: 68; 1862, **4**, 168; 1867, 9: 378.
Epuraeanella Crotch, 1874, Trans. Amer. Ent. Soc., **5**, 76.
Omosiphora Reitt., 1875, Verh. Nat. Ver. Brünn., **13**, 56 et 63.
Micrurula Reitt., 1884, Wien. Ent. Zeit., **3**, 209.
Micruria Reitt., 1874, Verh. Nat. Ver. Brünn., **13**, 58 et 64.
Genotype of *Epuraea*: *Nitidula decemguttata* Fabr.

Body rather small, more or less oblong. Head rather small, clypeus indistinct. Antennae a little longer than the head, first segment strongly enlarged anteriorly, second convex as long as the third, third to fifth elongate, sixth and seventh short, eighth more or less transverse, club rather large and oval. Antennal grooves rather feeble, strongly convergent posteriorly. Labrum rather deeply bilobed. Mandibles with a single tooth behind which is a smaller tooth and a beard. Lacinia broad and rounded at tip, heavily bearded. Maxillary palpi with first segment very small, the second clavate, the third very short and transverse, the fourth cylindrical and nearly as long as the others together. Mentum strongly transverse, feebly emarginate anteriorly. Labial palpi with first segment small, second clavate, the third greatly enlarged and rounded or securiform (subg. *Dadopora*). Pronotum as broad or nearly as broad as the elytra. Elytra truncate or entire; epipleurae broad and attaining the apices. Prosternal process widened and rounded behind the coxae. Mesocoxae about as far apart as the procoxae, the hind coxae far apart (Subg. *Epuraeanella*) or not. Middle and hind tibiae variously developed, sometimes sexually dimorphic (see key). The three middle ventral segments shorter than the first and fifth. In the male the additional eighth segment is visible from above (from beneath in *liebecki*). Tarsi dilated; sometimes the

posterior tarsi are feebly dilated. Claws simple or toothed (Subg. *Micrurula*).

This genus is most closely related to *Haptoncus* from which it differs in details of the mouthparts.

The genus *Epuraea* contains nearly 200 species found in all regions of the earth except South America. *Epuraea* is particularly well developed in the Holarctic region.

The members of this genus are most commonly found at sap in the spring. Some are found in fungi, in bees' nests, on flowers, or under old leaves.

Since the species could not all be keyed in the order in which they are described, the number after each species refers to its order in the natural arrangement.

Key to Nearctic Epuraea

1. Middle tibiae dissimilar in the two sexes, that of the male sinuate within and thickened at tip, that of the female slender 2
   Middle tibiae similar in the two sexes, slender 21
2. Intercoxal process of abdomen broad, truncate 3
   Intercoxal process of abdomen narrow, acute, metasternum usually notched for its reception 7
3. Length 5 mm. or more, form broadly oblong 4
   Length less than 5 mm., form more oval than oblong 5
4. Pronotal margins moderately explanate, hind angles rectangular . . . . . *monogama* (1)
   Pronotal margins not explanate, hind angles obtuse . . . *liebecki* (2)
5. Color yellow, elytra conjointly as wide as long . . . . . *horni* (3)
   Color testaceous to piceous, elytra conjointly longer than wide . . 6
6. Elytra narrower at apex, margins reflexed . . . . . *helvola* (4)
   Elytra scarcely narrower at apex, margins very narrowly reflexed . . . . . *rufa* (5)
7. Elytra obliquely prolonged, not truncate 8
   Elytra truncate at apex 10
8. Length 3 mm. or longer, pronotum not at all or moderately sinuate before the hind angles 9
   Length 2.4–3.2 mm., pronotum strongly sinuate before the hind angles . . . . . *papagona* (8)
9. Middle tibiae of male feebly dilated at tip . . . . . *integra* (7)
   Middle tibiae of male rather strongly dilated . . . . . *ambigua* (6)

10. Form oblong oval....11
Form elongate, parallel; middle tibiae of male feebly sinuate..18
11. Middle tibiae of male strongly sinuate within; the inward prolongation of the tip well marked....12
Middle tibiae of male feebly sinuate, tip merely thickened....14
12. Prothorax broadest at or near the base, hind angles rectangular.. ....*erichsoni* (11)
Prothorax distinctly narrowed at base....13
13. Sides of pronotum simply arcuate, hind angles not prominent... ....*rufida* (9)
Sides of pronotum sinuate posteriorly, hind angles rather acute.. ....*corticina* (10)
14. Large, pale yellow species with sides of thorax curved at base..17
Smaller, testaceous to fuscous, with sides of thorax obliquely narrowed and more or less sinuate at base....15
15. Hind angles of pronotum acute (perhaps also rectangular)..... ....*terminalis* (14)
Hind angles of pronotum subrectangular or rectangular....16
16. Fuscous above, elytral margins very narrowly reflexed..... ....*adumbrata* (12)
Pale testaceous to rufo-testaceous above, elytral margins less narrowly reflexed....*avara* (13)
17. Hind angles of thorax obtuse, margin very narrowly reflexed.... ....*fulvescens* (15)
Hind angles of thorax acute and prominent, margin broadly reflexed....*duryi* (16)
18. Prothorax one-half wider than long....*orantula* (20)
Prothorax one-third wider than long....19
19. Antennal segment 3 elongate, 4–8 short....*planulata* (19)
Antennal segments 3–5 moderately elongate....(20)
20. Surface moderately shining, distinctly punctate...*truncatella* (18)
Surface subopaque, obsoletely punctulate....*linearis* (17)
21. Abdominal intercoxal process broad, obtuse....22
Abdominal intercoxal process triangular, more or less acute...26
22. Elytra not spotted....23
Elytra spotted....25
23. Elytra very broadly truncate behind, apex subequal in width to base; male first ventral with 2 longitudinal rows of hairs..... ....*alternans* (21)
Elytra narrowing to the truncate apex; male first ventral not modified....24

24. Elytra narrowly margined; pubescence above gray, not conspicuous ..... *obtusicollis* (22)
    Elytra more widely margined: pubescence above long, conspicuous due to silvery lustre ..... *populi* (23)
25. Disc of pronotum uniformly dark colored; posterior male femora simple; body oblong, depressed ..... *flavomaculata* (24)
    Pronotum with a median longitudinal pale stripe; posterior male femora obtusely subangulate; body form more oval and convex ..... *peltoides* (25)
26. Last antennal segment much larger than preceding . *depressa* (26)
    Last antennal segment smaller than preceding 27
27. Prothoracic margin narrowly explanate 28
    Prothoracic margin broadly explanate 29
28. Less than 3 mm. long, apex of pronotum distinctly emarginate ... . *labilis* (27)
    Length of 3 mm. or more, apex of pronotum feebly emarginate .. .. *umbrosa* (28)
29. Elytra conjointly emarginate at apex ..... *scaphoides* (29)
    No alternate.

The species of this genus are extremely variable, and consequently very difficult to key accurately. The females can only be named by guess work, by association with similar males. Almost every collection contains some aberrant specimens and even distinct, unnamed species. These cannot be described until each is represented by a series of both sexes.

1. Epuraea monogama Crotch

Epuraea monogama Crotch, 1874, Trans. Amer. Ent. Soc., **5**, 76.

Type: from Vancouver and Sierra Nevada, California in a small globular fungus on dead pine, lectotype no. 7957 from Calif. in the M.C.Z. (Leconte coll.).

Very large, broadly oblong, depressed; above rufo-piceous to dark piceous, more rufous beneath; moderately shining; sparsely covered with short brown pubescence. Head moderately densely punctulate. Antennae rufous; segments 3, 4, 5 equal; 6, 7, 8 equal, each half the length of the three preceding segments. Prothorax feebly convex; its width to length as 1.7 to 1; narrowed in front; sides moderately arcuate, explanate, slightly reflexed, not fimbriate; hind angles rectangular; hind margin bisinuate. Elytra conjointly with width to length as 1 to 1.1; sides feebly arcuate, margin rather broadly and strongly reflexed; disc punctate as in the pronotum. Male and female

pygidia fimbriate. Middle tibiae of male sinuate within and thickened at tip, of the female simple. Male eighth dorsal segment visible from above. Length 5–5.5, width 2.6–3 mm.

Comparisons with *liebecki* are to be found under the latter species.

This species occurs (May–July) from British Columbia (North Bend, Salmon Arm, Vancouver) through Washington (Easton), Idaho (Moscow Mt.), to California (Napa, Cameno, along the Sierra Nevada) in Nevada and Texas (Rivers collector).

2. Epuraea liebecki spec. nov.

Very large, broadly oblong, depressed, feebly shining, sparsely pubescent. Color above dark ferrugineous, beneath (except antennal club) pale ferrugineous. Prothorax very feebly convex, with width to length as 1.6 to 1, narrowed in front, sides moderately arcuate, not explanate, finely fimbriate, hind angles broadly rounded, hind margin slightly bisinuate; surface finely alutaceous, densely, rather coarsely punctate, each puncture bearing a short recurved dark seta. Elytra conjointly with width to length as 1 to 1.1, lateral margins evenly and very feebly arcuate, not explanate, very narrowly reflexed, finely fimbriate. The sutural half of each elytron with about seven vague rows of obsolete tubercles, each tubercle bearing a moderately long recumbent dark seta. Surface of elytra more finely and sparsely punctate than the pronotum, each puncture bearing a short recumbent seta. Pygidium with long pale fimbriae. Middle tibiae of male feebly sinuate within and feebly thickened at tip. Male eighth dorsal segment visible only from beneath. Length 5–6.3, width 2.8–3.4 mm.

Although resembling *monogama*, *liebecki* is broader, duller, lateral pronotal margins fimbriate but not explanate, head more flat, pronotum more strongly emarginate at apex, hind angles more obtuse, and surface more coarsely punctate.

This species is known from three males from Arizona, holotype in the M.C.Z. (Liebeck coll.); a paratype in the collection of the author; and a paratype collected July 14 at Carr Canyon, Huachuca Mts. (A.M.N.H.).

3. Epuraea horni Crotch

Epuraea Horni Crotch, 1874, Trans. Amer. Ent. Soc., **5**, 76.

Type: from Grimsby, Canada (Pettit coll.) in the Philadelphia Acad. Nat. Sci.

Broadly oval, moderately shining, sparsely covered with short fulvous pubescence, color fulvous to testaceous. Head rather densely

punctulate; antennae proportioned as in *monogama;* anterior fourth of prosternum transversely wrinkled. Prothorax with width to length as 1.6 to 1, sides moderately arcuate and gradually narrowed from base to apex, feebly sinuate before the subrectangular hind angles, apex moderately emarginate, lateral margins more widely explanate posteriorly and very slightly reflexed, surface moderately densely punctulate. Elytra conjointly as wide as long, broadest near the middle, margins rather broadly explanate and feebly reflexed, surface more sparsely punctulate than the pronotum. Epipleurae very sparsely punctate. Male middle tibiae feebly sinuate within, and only moderately thickened and prolonged at tip. Length 3.7–4.5, width 2–2.4 mm.

The form of *horni* is nearest *helvola* but even broader.

This species occurs from Canada (Grimsby) and Pennsylvania (Crooked Creek) south to North Carolina, west to Illinois.

4. Epuraea helvola Erichson

Plates 4, figs. 9–16; pl. 12, fig. 12

Epuraea helvola Er., 1843, in Germar, Zeitschr. für Ent., **4**, 273.
Omosita castanea Melsh., 1846, Proc. Acad., Philad., **2**, 106.
Epuraea rufa Reitt. (non Say), 1873, Verh. Nat. Ver. Brünn., **12**, 28.
Types: of *helvola* from Pennsylvania in the Berlin Museum; of *castanea* from Pennsylvania in the M.C.Z. (Melsheimer coll.); of *rufa* from North Carolina probably in the Hungarian National Museum, Reitter coll.).

Broadly oval; moderately convex; moderately shining, covered with short, sparse, pale pubescence; color rufous to dark piceous, usually piceous brown, epipleurae and legs paler. Head coarsely, densely punctate. Prothorax with width to length as 1.6 to 1, apex deeply emarginate, base feebly bisinuate, sides strongly arcuate and narrowing at base, feebly sinuate in front of the subacute hind angles, margins broadly explanate and slightly reflexed, surface densely punctate and subgranulate. Elytra conjointly with width to length as 1 to 1.1, suture slightly elevated, margin reflexed, obsoletely punctate and subgranular. Male middle tibiae strongly sinuate and dilated at tip. Length 2.7–3.7 mm.

Closely resembling *rufa, helvola* differs in the more deeply emarginate prothorax, the more attenuate elytra, and the broadly reflexed elytral margins.

This species occurs (May–Oct.) from New Hampshire to Virginia (Afton, Crooked Corner) and Kentucky, west to Iowa (Mt. Pleasant), and Mantiba (Aweme, Winnipeg).

5. Epuraea rufa (Say)

Nitidula rufa Say, 1825, Journ. Acad. Philad., **5**, 180.
Omosita badia Melsh., 1846, Proc. Acad. Philad., **2**, 106.
Epuraea rotundicollis Reitt., 1873, Verh. Nat. Ver. Brünn., **12**, 25, 34.
Types: of *rufa* from eastern United States is lost; of *badia* from Pennsylvania is in the M.C.Z. (Melsheimer coll.); of *rotundicollis* from boreal America in the National Museum, Budapest (Reitter coll.).

Oval; moderately convex; color sometimes rufous, usually rufopiceous, beneath rufous; moderately shining; sparsely covered with short fulvous pubescence. Head densely punctate. Prothorax with width to length as 1.7 to 1, apex moderately emarginate, base feebly bisinuate, sides strongly arcuate and narrowing at base, feebly sinuate before the subacute and moderately prominent hind angles, margin broadly explanate but not reflexed, surface subgranular but not densely punctate. Elytra conjointly with width to length as 1 to 1.2, suture slightly elevated, margin narrow and slightly reflexed, surface densely punctate, subgranular. Male middle tibiae strongly sinuate and dilated at tip. Length 2.9–3.5 mm.

Comparisons with its nearest relative, *helvola*, will be found under the latter. This species occurs (March–October, chiefly June) beneath leaves, at sap, and in fungi from Ontario (Prince Edward Co.) and Quebec (Montreal) to Georgia (Clayton), west to Missouri, Kansas (Lawrence), Nebraska (Lincoln), Minnesota (Goodhue Co., bred from fallen seeds of *Acer saccharum*), and Lake Superior (White Fish Point, Isle Royale).

6. Epuraea ambigua Mannerheim

Epuraea ambigua Mann., 1843, Bull. Moscow, **16** (pt. 2), 256.
Type: from Kenai Peninsula, Alaska. A cotype (no. 7959) is in the M.C.Z. (Leconte coll.) and cotypes are presumably in the Zool. Mus., Helsingfors.

Oblong oval, fulvous to dark rufous, elytra often clouded with fuscous, moderately shining, very sparsely covered with fulvous pubescence. Prothorax with width to length as 1.6 to 1, apex feebly emarginate, base very feebly bisinuate, sides moderately arcuate, obliquely narrowing (but slightly if at all sinuate) before the subrectangular hind angles, margin narrowly explanate (posterior third more broadly) and slightly reflexed, surface rather densely punctate. Elytra conjointly with width to length as 1 to 1.4, apices prolonged not truncate, margin very narrowly reflexed, slightly more coarsely

punctate than the pronotum. Male middle tibiae feebly sinuate within and strongly prolonged inward. Length 3.4–3.8 mm.

This species occurs (May–August) from Alaska (Kenai) through British Columbia (Quesnel Lake) and Washington (Olympia) to California (Siskiyou Co., Eldorado Co., Santa Cruz Mts., San Mateo Co., Fieldbrook, Los Gatos).

7. Epuraea integra Horn

Epuraea integra Horn, 1897, Trans. Amer. Ent. Soc., **7**, 212.

Type: cotypes from Fort Whipple, Arizona (Palmer) and Colorado (Morrison) are in the Philad. Acad. Nat. Sci. and the M.C.Z. (Leconte coll.).

Oblong oval, rufo-testaceous, elytra sometimes fuscous, moderately shining, sparsely covered with short fulvous pubescence. Head densely punctate. Prothorax with width to length as 1.7 to 1, base slightly wider than apex; sides moderately arcuate, near the base obliquely narrowed and slightly sinuate before the rectangular, moderately prominent hind angles; margin moderately explanate, slightly reflexed; apex moderately emarginate; base slightly bisinuate, surface densely punctulate and subgranular. Elytra conjointly with width to length as 1 to 1.3, margin narrowly reflexed, apices conjointly rounded and covering the pygidium, suture slightly dehiscent at tip, surface densely punctulate and subgranular. Male middle tibiae feebly sinuate and feebly dilated at tip. Length 2.8–3.5 mm.

Although related to *ambigua*, *integra* differs in the male middle tibiae and the more prominent hind angles of the pronotum.

This species occurs (April–July) in Nevada and Colorado, south to Arizona (Williams, Fort Whipple, Pinal Mts., Globe, Santa Rita Mts., Chiricahua Mts.) and New Mexico (Beulah). Sharp records *integra* from Guatemala (7000–9000 ft., Quiche Mts.). Cockerell collected it in the nest of *Bombus juxtus* at Beulah, New Mexico, in July.

8. Epuraea papagona Casey

Type: from Arizona (Morrison) no. 6967, labelled "type" in Casey's handwriting, in the M.C.Z. (Leconte coll.).

Oblong oval, flavo-testaceous, moderately shining, sparsely covered with short fulvous pubescence. Head densely punctate. Prothorax with width to length as 1.5 to 1, base slightly wider than apex, sides moderately arcuate, near the base strongly sinuate, before the acute or rectangular hind angles, margins narrowly explanate except for

posterior halves which are broadly explanate, base bisinuate, surface densely punctulate. Elytra conjointly with width to length as 1 to 1.2, margin narrowly reflexed, the apex of each elytron evenly rotundo-truncate, suture not dehiscent at tip, surface a little more coarsely and sparsely punctate than the pronotum. Male middle tibiae very feebly sinuate within and very feebly thickened at tip. Length 2.4–3.2 mm.

Very closely related to *integra*, *papagona* tends to differ in its smaller size, acute posterior pronotal angles, more truncate elytral apices and apical sutural angles not dehiscent.

This species occurs in June on *Populus tremuloides* in Colorado, Arizona (Williams), and New Mexico (Albuquerque). Sharp's record of northern Sonora is almost certainly based on specimens Morrison collected in what is now southern Arizona.

9. Epuraea rufida (Melsheimer)

Omosita rufida Melsh., 1846, Proc. Acad. Philad., **2**, 106.

Type: from Pennsylvania is not in the Melsheimer collection (M.C.Z.) but may yet be found in the general collection, among which Melsheimer's specimens were distributed by Samuel Henshaw.

Oblong oval, testaceous to dark rufous, moderately shining, sparsely covered with short fulvous pubescence. Head densely, rather coarsely punctate; antennal segments 4, 5 as long as 3. Prothorax with width to length as 1.6 to 1, apex feebly emarginate, base feebly bisinuate, sides moderately arcuate, feebly narrowed but not sinuate before the subrectangular hind angles; margins moderately widely explanate and very slightly reflexed; surface moderately coarsely and densely punctate, subgranular. Elytra conjointly with width to length as 1 to 1.1, margin narrowly reflexed, apices truncate, surface densely punctate, subgranular. Male middle tibiae very strongly sinuate within and strongly thickened and prolonged inward. Length 3.5–4.1 mm.

Comparisons with its closest relative *corticina*, will be found after the description of the latter. Although resembling *erichsoni*, *rufida* is larger, more finely punctate, pronotal margin broader, and the pronotum more narrowed posteriorly.

This species occurs (April–Sept.) beneath bark of oak and on flowers of linden from Ontario (Rosseau) to South Carolina (Charleston), west to Louisiana (Vowell's Mill) north to Michigan (Gd. Ledge).

10. Epuraea corticina Erichson

Epuraea corticina Er., 1843, in Germar, Zeitschr. für Ent., **4**, 270.
Type: from North America (probably eastern Pennsylvania) in the Berlin Museum (Koch coll.).

Oblong oval, fulvous to fuscous, usually rufo-testaceous with disc of pronotum and elytra often clouded with a darker color, moderately shining, sparsely covered with short fulvous pubescence. Antennal segments 4 and 5 shorter than 3. Prothorax with width to length as 1.5 to 1, apex slightly narrower than base, rather strongly arcuate, feebly narrowed and sinuate before the usually acute (rarely rectangular) hind angles, margins narrow and very feebly reflexed, surface densely and rather finely punctate, finely alutaceous. Elytra conjointly with width to length as 1 to 1.3, margin narrowly reflexed, surface more coarsely and sparsely punctate than the pronotum. Male middle tibiae sinuate within and greatly dilated at tip. Length 3.1–3.6 mm.

The convexity of the prothorax and the sinuation of its sides are variable. This species is closely related to *rufida* but is slightly smaller, more convex, prothorax wider, its sides more arcuate and hind angles more acute, usually darker, and the male middle tibiae less prolonged inwards.

This species occurs (April–Sept., Dec.) under oak bark from New York (Rochester, N. Y. State List)to Florida (St. Augustine), west through Alabama (Mobile) to Louisiana (Winnfield), Mississippi (Meridian, Lucedale), Kansas (Douglas Co.), Iowa (Burlington, Mt. Pleasant), and Wisconsin; also "Nev." (A.N.S.P.).

11. Epuraea erichsoni Reitter

Epuraea Erichsoni Reitter, 1873, Verh. Nat. Ver. Brünn., **12**, 25, 35.
Type: from North America, cotypes in the Vienna Museum and Paris Museum (Marseul coll.).

Oblong oval, fulvous to dark rufous, usually luteo-testaceous, margins of elytra more or less fuscous, moderately shining, sparsely covered with short yellow pubescence. Head sparsely punctate. Prothorax with width to length as 1.6 to 1, apex very feebly emarginate, base feebly sinuate, sides feebly arcuate, only slightly narrowed before the rectangular hind angles, margin narrowly and feebly reflexed, surface densely, rather coarsely punctate. Elytra conjointly with

width to length as 1 to 1.2, margin narrowly reflexed, apices truncate, surface less densely punctate than the pronotum. Male middle tibiae strongly sinuate within and strongly thickened at tip. Length 2.2–3 mm.

It is similar to *labilis* but has a less emarginate pronotum and different middle male tibiae.

This species occurs (April–August) in the early spring beneath bark and at sap, later on flowers of maple, huckleberry, and various marsh plants from Ontario (Rosseau) and Quebec (Montreal) south to Florida, west to Texas, Nebraska, and Manitoba (Cedar Lake).

12. Epuraea adumbrata Mannerheim

Epuraea adumbrata Mann., 1852, Bull. Moscow, **25** (pt. 2), 336.
Type: from Sitka, Alaska, a cotype (no. 7960) is in the M.C.Z. (Leconte coll.) and cotypes are presumably in the Zool. Mus. at Helsingfors.

Oblong oval, moderately shining, color of cotype fuscous, beneath pale, except for antennal club, underside of meso- and metathorax and abdomen which are fuscous; covered with fine yellow pubescence. Head rather finely, densely punctate. Prothorax with width to length as 1.6 to 1, apex feebly emarginate, base moderately bisinuate, sides rather feebly arcuate, moderately narrowed and very slightly sinuate before the subrectangular hind angles, margins moderately broadly explanate and very slightly reflexed, surface densely punctate, subgranular. Elytra conjointly with width to length as 1 to 1.2, margins very narrowly reflexed, apex of each elytron truncately rounded, surface very slightly more coarsely and sparsely punctate than the pronotum. Male middle tibia very feebly sinuate and thickened at tip. Length 3 mm.

The above description is of the cotype. Horn was confused about this species. Specimens from Olympia, Washington (Liebeck coll.: M.C.Z.) have unicolorous antennae, the pronotum more coarsely punctate and with less explanate margins than the cotype. Although very closely related to *terminalis*, *adumbrata* differs in being darker, pronotum more convex, and more explanate, and more sparsely punctate, and the elytra less explanate.

This species occurs (May–July) from Alaska (Sitka, Tschunuktnu River, Kenai Peninsula) to Washington (Olympia) and Colorado (Douglas Co.), east to Quebec (Montreal) and south to North Carolina

13. Epuraea terminalis Mannerheim

Epuraea terminalis Mann., 1843, Bull. Moscow, **16** (pt. 1), 95.
Epuraea immunda Sturm, 1844, Deutschl. Fn. Ins., **15**, 59.
Epuraea infuscata Maklin, 1853, Bull. Moscow, **26** (pt. 2), 206.
For complete synonymy see Grouvelle, 1913.
Types: of *terminalis* from Finland (at sap on birch) presumably in the Zool. Mus. at Helsingfors; of *immunda* from Germany presumably in the Zool. Mus. at Munich; of *infuscata* from Kenai Peninsula, Alaska, a cotype (no. 8309) is in the M.C.Z. (Leconte coll.) and cotypes are presumably in the Zool. Mus. at Helsingfors.

Oblong oval, moderately shining, sparsely and finely pubescent, color rufo-testaceous, elytra laterally and apically tending to be clouded with fuscous, beneath rufo-testaceous, metasternum darker, antennae unicolorous or with club fuscous. Head densely punctulate. Prothorax with width to length as 1.7 to 1, apex very feebly emarginate, base very feebly bisinuate, sides moderately arcuate, moderately explanate, and slightly reflexed, more or less distinctly sinuate before the prominent, acute hind angles, surface densely punctulate, finely alutaceous. Elytra conjointly with width to length as 1 to 1.1, sides rather strongly, evenly arcuate, margin narrowly reflexed, surface more coarsely and sparsely punctate than the pronotum. Intercoxal process rather broad and triangular. Male middle tibiae abruptly but only moderately thickened at tip. Length 2.5–3 mm.

The species described by Horn under *immunda* is not this, but another unnamed one mentioned next. Arrow had sent Fall a European specimen of *terminalis* determined by Grouvelle which enabled Fall to determine that Horn's "*immunda*" was another species. The European *terminalis*, with one of its forms, in the writer's collection also show that it occurs in the New World.

This species occurs in Europe, across Siberia, and (May–July) from Alaska (Anchorage) south through British Columbia (Terrace) to Colorado (Douglas Co.), east to Wisconsin (Bayfield), Quebec (Joliette), and Maine (Paris).

Epuraea sp. nec terminalis (immunda auct.)

There is a species, widespread in western United States, that is labelled *immunda* in many collections, but is not *immunda* (=*terminalis*). A series of this species is in the Fall collection with the label "*immunda*" turned down. The Horn collection has a series from Salada Beach, California. It is difficult to determine just what the species is.

14. Epuraea avara (Randall)

Nitidula avara Rand., 1838, Boston Journ. Nat. Hist., **2**, 18.
Epuraea nubila Lec., 1857, Pacific R.R. Report. App. 1, p. 36.
Types: of *avara* from Maine (at sap on prostrate sugar maple) is lost; of *nubila* from San Jose, California (no. 6908) in the M.C.Z. (Leconte coll.).

Elongate oval, moderately shining, sparsely and finely pubescent, rufo-testaceous, often with three indistinct fuscous spots on each elytron. Head densely punctate. Prothorax with width to length as 1.5 to 1, apex slightly narrower than base, apex moderately emarginate, base moderately bisinuate, sides feebly arcuate, the posterior third feebly narrowed to the rectangular hind angles, margin moderately broad and slightly reflexed, surface densely punctate, finely alutaceous. Elytra conjointly with width to length as 1 to 1.2, apices rotundo-truncate, margins narrowly reflexed, surface finely alutaceous, more sparsely and coarsely punctate than the pronotum. Male middle tibiae very feebly sinuate within and slightly thickened at tip. Length 2.3–3.5 mm.

This is a very variable species. In particular, a specimen from El Dorado Crk., N. W. Terr. (Fall coll.: M.C.Z.) is more widely explanate and more sparsely punctate. Specimens from B. C., Calif., and Maine tend to be darker, pronotum with less explanate margins and more obtuse hind angles.

This species occurs especially at sap of maple and birch (May–August, chiefly June) from Yukon (El Dorado Crk.), British Columbia (Cawston), and Quebec (Joliette) south to California (San Jose), Nevada, New Mexico (Albuquerque), and South Carolina.

15. Epuraea fulvescens Horn

Epuraea fulvescens Horn, 1879, Trans. Amer. Ent. Soc., **7**, 290, 296.
Type: from Grimsby, Canada in the Philadelphia Acad. Nat. Sci.

Oblong oval, moderately shining, sparsely covered with yellow pubescence. color above and beneath fulvous, antennal club sometimes darker. Prothorax with width to length as 1.7 to 1, apex feebly emarginate, base feebly bisinuate, sides very feebly arcuate, not sinuate before the more or less obtusely subrectangular hind angles, margin very narrowly explanate, surface rather coarsely and densely punctate, finely alutaceous. Elytra conjointly with width to length as 1 to 1.2, margin moderately narrowed, apex of each elytron broadly rounded, surface very slightly more coarsely and sparsely punctate

than the pronotum. Male middle tibiae slightly stouter than the posterior and feebly thickened at tip. Length 3–3.5 mm.

This very rare species occurs in June from Canada (Grimsby) to Georgia (Clayton).

16. Epuraea duryi Blatchley

Epuraea duryi Blatchley, 1910, Coleoptera of Indiana, p. 639, fig. 240.
Type: from Crawford Co., Indiana in the Blatchley coll. at Purdue University, Lafayette, Ind.

Broadly oval, subdepressed. Uniform pale yellow, sparsely pubescent, distinctly shining. Head finely and sparsely punctate. Thorax two-thirds wider than long, widest at middle, the sides thence converging and nearly straight to apex, feebly curved to base; disk finely and rather sparsely punctate, broadly and shallowly impressed near the hind angles. Elytra together a little longer than wide, tips subtruncate; disk finely and rather sparsely punctate. Abdomen finely granulate-punctate. Intercoxal process rather broad, but acute at apex. Length 3.5–4.7 mm.

Since *duryi* is unknown to the writer, the above description is copied from Blatchley. In the writer's collection is a female from East Dorset, Vt., which is much nearer *duryi* than any other species. But it is rufo-testaceous and has the pronotum somewhat differently shaped and punctate.

This species is known only from Blatchley's records of Indiana (Crawford Co., June 27–28) and Ohio (Cincinnati, collected by Charles Dury and presumably in his collection).

17. Epuraea linearis Mäklin

Epuraea linearis Mäklin, 1853, Bull. Moscow, **26**, 205.
Type: cotype (no. 8308) from the interior of the Kenai Peninsula, Alaska is in the M.C.Z. (Leconte coll.) and cotypes are presumably in the Zool. Mus. at Helsingfors.

Oblong to elongate, parallel; subopaque; piceo-rufous, elytra darker than the pronotum; when dark piceous or black the pronotal margins may be testaceous; sparsely covered with pale pubescence. Head sparsely, obsoletely punctulate. Antennae rufous, segments 6–8 very short. Prothorax with width to length as 1.5 to 1, very little wider at base than at apex, sides evenly very feebly arcuate, margin very narrowly reflexed, apex very feebly emarginate, base very feebly

bisinuate, hind angles subrectangular, surface variably obsoletely punctulate, subgranulate. Elytra conjointly with width to length as 1 to 1.5, apices rotundo-truncate, margin very narrowly reflexed, surface slightly more coarsely and sparsely punctate than the pronotum. Length 2.7–3 mm.

A specimen from Quesnel Lake, B. C. (Kans. Univ. coll.) has the lateral margins more broadly explanate and the apex of the pronotum more distinctly emarginate. Examples from the southwest (U.S.N.M.) have the discs of the pronotum and elytra mainly black.

This species occurs on pine and spruce (May–Sept.) from Alaska (Kenai Peninsula, Seward, Sitka) through British Columbia (Quesnel Lake, Vancouver), Alberta (Edmonton), Oregon (Astoria), Montana (Sula), South Dakota (Black Hills), Colorado (Veta Pass) to Arizona (Chiricahua Mts.) and New Mexico (Clouderoft); also New Hampshire (Waterville: U.S.N.M.). This last record should be rechecked.

18. Epuraea truncatella Mannerheim

Epuraea truncatella Mann., 1846, Bull. Moscow, **19** (pt. 2), 514.
Epuraea nigra Mäklin, 1853, Bull. Moscow, **26** (pt. 3), 204.
Types: of *truncatella* from Sitka, Alaska presumably in the Zool. Mus. at Helsingfors; of *nigra* a cotype from Kenai Peninsula, Alaska is in the M.C.Z. (Leconte coll.) and cotypes are presumably in the Zool. Mus. at Helsingfors.

Elongate, parallel, sparsely pubescent, moderately shining, color piceo-testaceous to nearly black, antennae unicolorous or with club darker. Head sparsely punctate. Prothorax with width to length as 1.3 to 1, apex feebly emarginate, base truncate, sides feebly arcuate and at posterior third narrowed and more or less strongly sinuate before the subrectangular or rectangular hind angles, margin narrowly explanate but more widely posteriorly, more or less feebly reflexed, surface densely punctate, finely alutaceous. Elytra conjointly with width to length as 1 to 1.4, narrowly reflexed, slightly more sparsely punctate than the pronotum, finely alutaceous. Male middle tibiae sinuate within and strongly dilated at tip. Length 2.5–3 mm.

In color and degree of elongation *truncatella* varies considerably. It is easily confused with *planulata* and is compared under the latter.

This species occurs (April–August) from Alaska (Kenai Peninsula, Seward) through Yukon (Klondike), British Columbia (Terrace), Alberta (Edmonton), Ontario (Rosseau), Quebec (Hull) to Labrador (Ungava Bay), south to California (Sisson, Los Gatos, Lassen Co. on

Pinus jeffreyi), Nevada, Colorado (La Veta), New Mexico (Cloudcroft, Las Vegas, 11000 ft.), Indiana (Lawrence Co. in decaying fungi), West Virginia (Kingmont), and Virginia (Lee Co.).

19. Epuraea planulata Erichson

Epuraea planulata Er., 1843, in Germar, Zeitschr. für Ent., **4**, 271.
Epuraea placida Mäklin, 1853, Bull. Moscow, **35**, 203, sep. p. 111.
Types: of *planulata* from Sitka, Alaska in the Berlin Museum; of *placida* a cotype (no. 8311) from Kenai Peninsula, Alaska is in the M.C.Z. (Leconte coll.) and cotypes are presumably in the Zool. Mus. at Helsingfors.

Elongate, rufous to piceous usually rufo-piceous, when pale the elytra often clouded with a darker color; moderately shining; sparsely covered with pale pubescence. Head sparsely punctulate; antennal segment 3 moderately elongate, 4 and 5 shorter. Prothorax with width to length as 1.4 to 1, apex feebly emarginate, slightly narrower at apex than at base, sides very feebly arcuate, more or less feebly narrowing and more or less feebly sinuate before the rectangular hind angles, base truncate, margin very narrowly or moderately explanate and slightly or not at all reflexed, surface densely punctate, finely alutaceous. Elytra conjointly with width to length as 1 to 1.4, each elytral apex broadly rounded, margin very narrowly reflexed, surface slightly more coarsely punctate than the pronotum. Length 2.5–3 mm.

It is not easy to separate *planulata* from *truncatella*, but the former has differently formed antennae; the pronotum is more depressed, its sides less arcuate and sinuate posteriorly, its margins less explanate.

In Leng's Catalogue *boreella* Zetterst. is given as possibly the same as *planulata*. In the writer's collection is a series from Europe which show *boreella* to be more closely related to *truncatella*, from which it differs in the sides of the pronotum being more arcuate, more sinuate, etc.

This species occurs (May–July) from Alaska (Kenai Peninsula, Sitka) through British Columbia (Terrace), Alberta (Edmonton), to Quebec (Montreal), south to Washington, Nevada, Colorado (Ouray, 8000 ft.), and in the east to North Carolina (Toxaway Lake).

20. Epuraea ornatula Notman

Epuraea ornatula Notman, 1919, Journ. N. Y. Ent. Soc., **27**, 102.
Type: from Cochrane, Ontario (August 22–30) in the collection of Howard Notman.

Oblong, slightly elongate, rather convex, rufo-testaceous. Prothorax one-half wider than long, narrowed in front, sides moderately arcuate from apex to one-third from the base, thence obliquely narrowed to the posterior angles which are obtuse, distinct, but finely rounded. Pronotal margins widely explanate, narrowly, strongly reflexed. Third antennal segment twice as long as wide, one-third longer than fourth, fourth and fifth equal, six-eight shorter. Elytra twice the length of the prothorax. Intercoxal process narrow and triangularly acute. Male middle tibiae faintly sinuate on inner edge and strongly dilated at tip. Length 2.25, width 1 mm.

Since the type of *ornatula* was not seen, the exact identity of this species is a question. Notman compares it with *borecella* (evidently meaning *planulata*) but says that *ornatula* is smaller, differently formed and colored. In the writer's collection is a series from North Elba, New York which agree with Notman's description except for being rufo-piceous and the antennae somewhat intermediate.

This species is known definitely only from Cochrane, Ontario and possibly from North Elba, Essex co., N. Y. (Oct.).

21. Epuraea alternans Grouvelle

Epuraea alticola Fall, 1907, (nec Sharp) Trans. Amer. Ent. Soc., **33**, 223.
Epuraea alternans Grouv., 1912 (1913), Ann. Soc. Ent. France, **81**, 394.
Type: from 11,000 ft., Las Vegas Range, New Mexico in the M.C.Z. (Fall coll.).

Broadly obtusely oval, testaceous, moderately shining, sparsely covered with fine, yellow pubescence. Head moderately sparsely punctate. Prothorax with width to length as 1.7 to 1, apex strongly emarginate, base feebly bisinuate, sides moderately arcuate, the posterior third narrowed and very slightly sinuate before the subrectangular hind angles, margins moderately explanate and slightly reflexed, surface sparsely punctate and finely granular. Elytra conjointly with width to length as 1 to 1.1, convex, margins narrowly reflexed, apices rather distinctly truncate, surface more coarsely and densely punctate than the elytra. First ventral segment with two longitudinal lines of hairs at the middle. Intercoxal process broad, obtuse. Length 2.4, width 1.4 mm.

This species is distinctive in the ventral rows of hairs and the very truncated elytra. It is related to *ovata* but is more depressed, elytral apices more truncate, the pronotum less explanate, etc.

It is known only from the male holotype (no. 24,486).

22. Epuraea obtusicollis Reitter

Epurea obtusicollis Reitt., 1873, Verh., Nat. Ver. Brünn, **12**, 24, 32.
Epuraea ovata Horn, 1879, Trans. Amer. Ent. Soc., **7**, 298.
Type: Amer. bor. (Mus. Chevrolat); of *ovata*, from Michigan (Schwarz), Canada (Pettit) and California (Crotch) in the Philad. Acad. Nat. Sci. and a cotype no. 7962 from Michigan is in the M.C.Z. (Leconte coll.).

Oval; rufo-piceous, rarely testaceous, margins paler; moderately shining; convex, particularly the elytra; sparsely covered with pale yellow pubescence. Head moderately densely punctate. Prothorax with width to length as 1.7 to 1, apex narrower than base and moderately deeply emarginate, sides strongly arcuate posteriorly and strongly narrowed to retracted, small, distinct, rectangular hind angles, margins narrowly to widely explanate and moderately reflexed; base very feebly bisinuate; surface rather sparsely punctate and finely alutaceous. Elytra often fuscous, conjointly with width to length as 1 to 1.2, sides gradually narrowing to the apices which are conjointly rounded and not truncate, margins rather narrowly reflexed, surface more coarsely and densely punctate than the pronotum. Male middle tibiae simple. Length 2–3 mm.

Horn's description of *obtusicollis* was based on the type. Subsequently he received specimens from the District of Columbia (Ulke) which he named this species. It is similar to *ovata* except that it averages smaller (2 mm.), is more finely punctate, the pronotal and elytral margins more narrow, and the color testaceous or rarely piceous. The form is known from Mass. (Sherborn), New York, District of Columbia, and California (Lake Tahoe). Since the variable *ovata* grades into *obtusicollis*, it seems impossible to retain the former as a distinct species.

This species occurs under beech bark, in fungus, and in the fall under old leaves and in humus (May–Sept., chiefly June) from Quebec (Montreal, Quebec) and Maine (Mt. Katadin, 5060 ft.) to North Carolina (Black Mts.), west through Pennsylvania, Indiana, Nebraska (Nebraska City), Colorado (Garland), Arizona to California (Pasadena, Lake Tahoe), north to Alberta (Edmonton) and Manitoba (Winnipeg).

23. Epuraea populi Dodge

Epuraea populi Dodge, 1939, Ent. News, **50**, 288.
Type: from Itaska Park, Minnesota, June 15 (allotype, July 9) in the U.S.N.M. Paratypes are in the M.C.Z., A.N.S.P., A.M.N.H., F.M.N.H., H. R. Dodge coll., and C. T. Parsons coll.

Broadly oblong-oval, uniformly dark piceous, somewhat paler beneath, moderately shining, sparsely covered with rather long, silvery grey pubescence. Head densely punctate, rather deeply foveate between the eyes. Prothorax with width to length as 1.8 to 1, apex moderately emarginate and distinctly narrower than the base, base feebly bisinuate, sides moderately arcuate and very slightly narrowed before the subrectangular hind angles, margin broadly explanate and slightly reflexed, an oblique depression on each side of the disc before the hind angles, surface rather sparsely, obsoletely, and finely punctate, finely alutaceous. Elytra conjointly with width to length as 1 to 1.1, sides evenly, feebly arcuate, apices rather distinctly truncate, margin very narrowly explanate, slightly reflexed, surface slightly more coarsely and sparsely punctate than the pronotum. Intercoxal process broadly triangular. Length 2.9 mm.

This species occurs on the bark of dead or dying aspen *Populus tremuloides* (May 27–July 25) in Minnesota (Itaska Park) and Michigan.

24. Epuraea flavomaculata Mäklin

Epuraea flavomaculata Mäklin, 1853, Bull. Moscow, **26**, 205.
Epuraea depressa (Ill.) of authors, in error.
Type: from Kenai Peninsula, Alaska is presumably in the Zool. Mus. at Helsingfors.

Rather broadly oblong-oval, rarely broadly oval, shining, very sparsely pubescent, color brown to piceous, lateral margins and an anterior and posterior spot on the disc of each elytron testaceous, the anterior pair of spots are larger than the posterior and more often tend to be contiguous along the suture, beneath brown to piceous. Head densely, rather coarsely punctate. Prothorax with width to length as 1.8 to 1, apex moderately emarginate, base feebly bisinuate, sides rather feebly arcuate, posterior third moderately narrowed to subrectangular hind angles, margins moderately explanate and feebly reflexed, surface densely punctate and finely alutaceous. Elytra conjointly with width to length as 1 to 1.2, margin moderately narrowly reflexed, apices moderately prolonged, surface more coarsely and sparsely punctate than the pronotum. Male middle tibiae simple. Length 2.5–3.4 mm.

Apparently most closely related to *peltoides*, *flavomaculata* differs in being more oblong, less convex, with different color and posterior male femora.

This species occurs (May–Sept., chiefly June) from Ontario (Rainy

R. Dist., Beaver Mine) to New Hampshire (Mt. Washington) west through Michigan (Detroit) to Manitoba (Winnipeg) and Alberta (Edmonton); also New Mexico (Cloudcroft, 9000 ft.).

25. Epuraea peltoides Horn

Epuraea peltoides Horn, 1879, Trans. Amer. Ent. Soc., **7**, 298.
Type: cotypes from Michigan (Schwarz) and Maryland in the Philadelphia Acad. Nat. Sci. and the M.C.Z. (Leconte coll., no. 7963).

Oval to rather broadly oval, dark piceous above with the following markings testaceous to fuscous: pronotal margins and a median longitudinal stripe on basal half of pronotum, the margin of each elytron and four spots of which one on the humeral umbone and one posterior to it at the elytral two-fifths are of equal size; a larger spot on the suture at the elytral three-fifths, and the largest spot at the inner basal angle of the elytron; beneath testaceous to fuscous; moderately shining, sparsely covered with pale greyish pubescence. Head sparsely punctate. Prothorax with width to length as 1.8 to 1, apex strongly emarginate, base feebly bisinuate, sides rather strongly arcuate, hind angles prominent and rectangular, margin more or less broadly explanate, feebly or moderately reflexed, surface rather sparsely punctate. Elytra conjointly with width to length as 1 to 1.1, sides evenly feebly arcuate, margin narrowly reflexed, apices feebly truncate. Intercoxal process moderately broad and obtuse at tip. Male posterior femora are obtusely subangulate near the tip. Length 2.5–3.2 mm.

This species occurs (May–Sept., chiefly in the spring) from Ontario and Quebec (Montreal) to Virginia, west to Indiana and Wisconsin (Madison).

26. Epuraea depressa (Illiger)

Nitidula depressa Illiger, 1798, Käfer Preuss., **1**, 386.
Nitidula aestiva Fabr., 1775, Syst. Ent., p. 77.
Epuraea convexiuscula Mann., 1843, Bull. Moscow, **16** (pt. 2), 255.
For complete synonymy see Grouvelle, 1913.
Types: of *depressa* from Germany either in the Naturh. Mus. at Braunschweig or in the Berlin Museum; of *aestiva* from Europe (on flowers) possibly at Kiel or Copenhagen; of *convexiuscula* from Sitka, Alaska, cotypes presumably in the Zool. Mus. at Helsingfors and a cotype no. 8312 in the M.C.Z. (Leconte coll.).

Oval, slightly oblong; convex; rufo-testaceous or rufous, sometimes an elongate fuscous spot on each elytron; moderately shining; sparsely

covered with testaceous pubescence. Head densely punctate; terminal segment of antennae somewhat quadrangular, as large or larger than the two preceding segments together, that of the female larger than that of the male. Prothorax with width to length as 1.8 to 1, apex moderately emarginate and distinctly narrower than the base, base very feebly bisinuate, sides feebly evenly arcuate sometimes very feebly obliquely narrowed before the subrectangular hind angles, margin narrowly explanate and very slightly reflexed, disc with a vague depression on each side near the hind angles, surface densely rather coarsely punctate, finely subrugose. Elytra conjointly with width to length as 1 to 1.25, margin very narrowly reflexed, apices separately rounded and feebly truncate, surface more sparsely truncate than the prosternum. Intercoxal process acutely oval in front. Length 2.5–3.5 mm.

This is more convex than any other Nearctic *Epuraea* and easily recognized by the greatly enlarged terminal segment of the antenna. Comparisons with its closest Nearctic relative will be found under *labilis*.

This species occurs on flowers in the spring (May–July) in Europe, northern Asia, and from Alaska (Unalaska I., Sitka) through British Columbia (North Bend), Manitoba (Aweme), to Ontario (Prince Edward Co.) south to California (Alameda Co., Lake Tahoe), Nevada, New Mexico (Beulah), Texas and Florida.

27. Epuraea labilis Erichson

Epuraea labilis Er., 1843, in Germar, Zeitschr. für Ent., **4**, 272.
Type: from North America (probably Pennsylvania) in the Berlin Museum.

Oval, slightly oblong, distinctly convex, rufo-testaceous, moderately shining, sparsely covered with pale pubescence. Head rather densely and coarsely punctate. Prothorax with width to length as 1.7 to 1, apex slightly narrower than the base and feebly emarginate, sides feebly arcuate and very slightly obliquely narrowed before the subrectangular hind angles, margin narrowly explanate and slightly or not at all reflexed, surface rather coarsely and moderately densely punctate. Elytra conjointly with width to length as 1.2 to 1, apex rather distinctly truncate, sides very narrowly reflexed, punctate as in the pronotum. Intercoxal process broadly triangular. Length 2–2.5 mm.

Evidently closely related to *depressa*, *labilis* differs in the much

smaller terminal antennal segment, the more acute intercoxal process, body slightly less convex, and the elytral apices more truncate.

This species occurs on flowers of dogwood, elder, etc. (May–Sept., chiefly in the spring) from Ontario (Toronto) and Quebec (Joliette) to Georgia, west to Texas, Kansas (Douglas Co.), and Manitoba (Winnipeg).

28. Epuraea umbrosa Horn

Epuraea umbrosa Horn, 1879, Trans. Amer. Ent. Soc., **7**, 300.

Type: from Fort Cobb, Caddo Co., Oklahoma, lectotype no. 3209 in the Philadelphia Acad. Nat. Sci. and cotype no. 7964 in the M.C.Z. (Leconte coll.).

Oval, slightly oblong, moderately shining, rufo-testaceous to ferrugineous (cotype is pale testaceous), elytra usually somewhat clouded with fuscous, so that an oval pale intra-humeral spot and another subapical spot are indicated, sparsely covered with yellow pubescence. Head densely punctate, antennae unicolorous. Prothorax with width to length as 1.5 to 1, apex feebly emarginate, base moderately bisinuate, sides evenly moderately arcuate and slightly narrower at base than at middle, hind angles subrectangular, margin very narrowly reflexed, surface rather coarsely moderately densely punctate, obsoletely subgranular. Elytra conjointly with width to length as 1 to 1.5, apices truncate, margin narrowly reflexed, surface punctate as in the pronotum. Male middle tibiae simple. Length 3–3.5 mm.

This species seems to be most nearly related to *labilis*, but is larger, the pronotum less emarginate apically and less explanate laterally. A pair from Cloudcroft, New Mexico (Kans. Univ. coll.) is very aberrant in having the pronotum and elytra much more broadly reflexed. Also the pronotum of one is broader than usual. These specimens resemble an elongate ferrugineous *populi*.

This species occurs (March 26–Sept. 1) from Texas (Lee Co., Columbus, Fedor) through Oklahoma (Ft. Cobb, Caddo Co.), Arkansas, Georgia, to North Carolina (Southern Pines) and New York (Lake George); also the aberrant pair from Cloudcroft, New Mexico.

29. Epuraea scaphoides Horn

Epuraea scaphoides Horn, 1879, Trans. Amer. Ent. Soc., **7**, 300.

Type: from Colorado (Morrison) in the Philadelphia Acad. Nat. Sci. (holotype no. 3208).

Elongate oval, depressed, uniformly rufo-testaceous, rather feebly shining, very finely and sparsely pubescent. Head moderately densely

punctate; the third and fourth antennal segments of equal length and about three-fourths the length of the second. Prothorax one-third wider than long, slightly narrower in front, apex deeply emarginate, base truncate, sides feebly arcuate, hind angles rectangular, margins broadly explanate and strongly reflexed, surface moderately finely, densely punctate. Elytra conjointly one-third longer than wide, moderately narrower posteriorly, apices circularly conjointly emarginate, margin broadly explanate and strongly reflexed, surface punctate as in the pronotum. Intercoxal process triangular, acute. Length 3 mm., width 1.6 mm.

As Horn says, this is a most peculiar species, since it resembles a miniature *Embaphion* with the elytra conjointly emarginate

It is known only from the male holotype.

3. Orthopeplus Horn

Plates 5, 12

Orthopeplus Horn, 1879, Trans. Amer. Ent. Soc., **7**, 311.
Genotype: *Orthopeplus quadricollis* Horn.

Body elongate, parallel, glabrous, head broad and concave above, clypeus indistinct. Antennae longer than the head, first segment enlarged, second convex, third to fifth about of equal length; club large not compact. Antennal grooves broad, convergent behind. Labrum feebly bilobed. Mandibles acute at tip, feebly toothed on inner surface. Maxillary palpi with first segment small, next two about of equal length, the third thick and truncate at tip. Mentum apparently feebly emarginate in front. Pronotum as broad as the elytra. Prosternal process moderately expanded behind the coxae, elevated at tip, and subconically protuberant. Elytra long, exposing only the tip of the pygidium; epipleurae rather narrow, attaining the apices. Mesosternum not carinate. The procoxae and metacoxae about twice as far apart as the nearly contiguous mesocoxae. First and fifth ventral segments long, about of equal length; the second to fourth short and of equal length. An additional deflexed dorsal segment is clearly seen in the male. Anterior tarsi moderately dilated, other tarsi simple. Claws simple.

This genus is rather closely related to *Epuraea*, differing in details of maxillae, antennae, prosternal process, and tarsi. *Orothopeplus* contains only one rare species from the cordilleran region of the United States.

Orthopeplus quadricollis Horn

Plates 5, figs. 1–5; pl. 12, fig. 13

Orthopeplus quadricollis Horn, 1879, Trans. Amer. Ent. Soc., **7**, 312.
Type: from Colorado (Morrison) in the Philadelphia Academy of Natural Sciences.

Elongate, parallel, moderately convex, glabrous, moderately shining, rufo-piceous, elytra darker. Head broadly concave, minutely punctate. Prothorax with width to length as 1.1 to 1, very slightly narrower posteriorly, apex feebly emarginate, sides very feebly arcuate and narrowly margined, base very feebly arcuate, disc moderately convex and transversely flattened anteriorly, surface finely densely punctate. Elytra parallel, very narrowly margined, apices rotundo-truncate, surface more coarsely and sparsely punctate than the pronotum. More distinctly punctate beneath; abdomen sparsely pubescent. Length 2.5, width 1 mm.

This species occurs on *Pinus ponderosa* (June-Sept.) from Colorado (Estes Park) and New Mexico (Cloudcroft) to Arizona (Grand Canyon, Flagstaff, Santa Catalina Mts.).

4. Stelidota Erichson

Plates 4, 12

Stelidota Er., 1843, in Germar, Zeitschr. für Ent., **4**, 300.
Genotype: *Nitidula geminata* Say.

Body oval, rather convex, moderately small. Head small, clypeus may or may not be distinct. Antennae a little longer than the head, first segment strongly enlarged anteriorly, second convex, third to fifth narrow and elongate, sixth to eighth short, club oval. Antennal grooves suboccular, parallel, and moderately deep. Labrum bilobed. Mandibles with a small tooth behind the apex, bearded. Lacinia short, broad, rounded at tip, heavily bearded apically and on inner side. Maxillary palpi with first segment small, second clavate, third short and transverse, fourth cylindrical, about as long as the other three. Ligula with rather small paraglossae; labial palpi with first segment minute, second clavate, third thick, oblong, with or without a seta at apex. Mentum transverse, broadly and deeply emarginate anteriorly. Pronotum as broad or broader than the elytra. Elytra tapering apically; epipleurae broad, attaining the apices. Prosternal process broad, elevated and rounded behind the coxae. Mesocoxae a little further apart than the procoxae. Metacoxae nearly twice as far apart as the mesocoxae. The male additional dorsal segment may

be distinctly visible or scarcely evident. Middle and posterior tibiae sometimes apically dilated in the male. Tarsi moderately dilated. Claws simple.

Stelidota is intermediate between *Epuraea* and *Ipidia* and most closely related to *Epuraea*. The Brazilian *Pseudostelidota* is unknown to the writer.

The genus *Stelidota* contains about 40 species which are generally distributed except in continental Africa. It is primarily a tropical genus and the three North American species seem to have a Neotropical origin. The species are found at sap in the spring, and later at rotten fruit, fungi, and under chips.

Key to Nearctic species

1. Prothorax at apex deeply emarginate, base distinctly bisinuate, margin broad and deplanate 2
   Prothorax at apex feebly emarginate, base truncate, margin narrow and not deplanate at base ..... *strigosa*
2. Prothorax arcuately narrowed from base to apex, broadest at base .. .. *geminata*
   Prothorax with sides more arcuate at base, so that the thorax is narrower at base than a little in front ..... *octomaculata*

Stelidota strigosa (Gyllenhal)

Nitidula strigosa Gyll., 1808, Syn. Insect., **1** (pt. 2), 140.
Nitidula lusca Gyll., *loc cit.*
Types: of both species from St. Eustatius Isl., Lesser Antilles (Forsström) presumably in the Zool. Mus. of the University, Upsala.

Oval, narrower posteriorly, moderately shining, rather sparsely pubescent, testaceous to rufo-piceous, elytra indistinctly maculate in the paler specimens. Prothorax nearly twice as wide as long, narrowed in front, sides arcuate, hind angles subrectangular, margin narrow not deplanate, disc moderately convex, surface coarsely, densely, substrigosely punctate. Each elytron not subcostate but with 11 rows of coarse, closely placed punctures, between which are rows of sparsely spaced fine punctures, each of which bears a pale hair. Beneath densely, rather coarsely punctate. Length 1.5—2.5 mm.

This species occurs throughout the year but chiefly in the spring from Michigan (Marquette) and New Jersey to Florida (generally distributed) west to Kansas (Onaga) and Arizona, south through Central America and the West Indies into South America.

Stelidota geminata (Say)

Plates 4, figs. 17–23; pl. 12, fig. 14

Nitidula geminata Say, 1825, Journ. Acad. Philad., **5**, 181.
Type: of *geminata* from eastern United States is lost.

Oval, narrower posteriorly, moderately shining, sparsely punctate, testaceous to rufo-piceous, elytra with indistinct pale spots. Head coarsely, densely, shallowly punctate. Prothorax twice as wide as long, narrower in front, apex deeply emarginate, base bisinuate, sides regularly arcuate from base to apex, margin broad, deplanate, hind angles rectangular, disc moderately convex, surface coarsely, densely punctate. Elytra slightly broader than the pronotum. Each elytron with 9 costae each of which has a row of fine punctures, each puncture bearing a short pale hair. Between the costae are rows of large, shallow punctures. Beneath moderately densely, coarsely punctate. In the male the middle and posterior tibiae distinctly arcuate, the former suddenly dilated in its distal half, the latter in the distal third. Length 2-3 mm.

This species occurs (Feb. 20-Oct. 23) chiefly in the spring from Massachusetts (Tyngsboro, Springfield) to Florida (Capron, Haulover, Edgewater, Miami, Paradise Key), west to Iowa (Mt. Pleasant), Missouri (St. Louis) and Texas (Columbus), south through Middle America to Colombia and Brazil.

Stelidota octomaculata (Say)

Nitidula octomaculata Say, 1825, Journ. Acad. Philad., **5**, 181.
Stelidota biseriata Reitt., 1874, Verh. Nat. Ver. Brünn, **12**, 15.
Types: of *octomaculata* from the Arkansas River in eastern Colorado is lost; of *biseriata* from Baltimore, Maryland, Cuba, and Brazil presumably in the National Museum, Budapest (Reitter coll.) and a cotype "Am. sept." in the Philadelphia Acad. Nat. Sci.

Oval, narrower posteriorly, moderately shining, sparsely pubescent, dark rufous to piceous, elytra with more or less indistinct pale spots. Thorax twice as wide as long, narrower in front, apex deeply emarginate, base bisinuate, sides arcuate, more abruptly so posteriorly, hind angles subrectangular, margin broad, moderately deplanate, surface densely, coarsely punctate. Elytra as broad as the pronotum. Each elytron with 9 rows of large, very shallow, oval, closely placed punctures between which are rows of very sparsely placed fine punctures, each bearing a short pale hair. Beneath coarsely, densely punctate. In the male the eighth dorsal segment is particularly evident. Length 2.2—3.5 mm.

Horn placed *biseriata* as a synonym of *geminata*, but the cotype in his collection belongs to *octomaculata*.

This species occurs (April-Oct., chiefly in the spring) from Ontario (Toronto) and Quebec (Montreal) to Florida, west to New Mexico (Las Vegas Hot Springs), Arizona (Tucson), Nebraska (West Pt.), Michigan (Lansing, Adrian, Marquette), and Wisconsin (Clintonville).

5. Omosita Erichson

Plate 4, figs. 24–31; pl. 12, fig. 15

Omosita Er., 1843, in Germar, Zeitschr. für Ent., **4**, 298.
Genotype: *Silpha colon* Linn.

Oblong oval, moderately convex. Antennae longer than the head, first segment enlarged, second convex and as long as the third, club large and compact. Antennal grooves deep, slightly convergent posteriorly. Labrum feebly bilobed. Mandible usually pointed with a tooth on inner side, but may be blunt and untoothed. Lacinia broad and rounded at tip, heavily bearded. Maxillary palpi with first segment small, second much longer and clavate, third shorter than the second, fourth cylindrical and a little longer than the second. Ligula with rather large laterally projecting paraglossae, the palpi with first segment small, the next two long and of equal length. Mentum transverse, emarginate in front. Epipleurae broad and attaining the elytral apices. Elytra long; pygidium exposed. Prosternal process broad and expanded behind the coxae. Mesocoxae a little further apart than the procoxae; metacoxae slightly further apart than the mesocoxae. Male eighth dorsal segment scarcely visible. The tarsi, particularly the anterior pair, are strongly dilated. Claws simple.

This genus is more or less intermediate between *Nitidula* and *Epuraea*.

Omosita contains nine species, of which two occur in New Zealand, one is Indian, one is from Mexico and Guatemala, three are Palaearctic, and two are Holarctic. There is evidence that the Holarctic forms originated in the Old World.

Posterior halves of elytra mainly testaceous ..... *colon*
Posterior halves of elytra mainly piceous ..... *discoidea*

Omosita (Saprobia) colon (Linn.)

Silpha colon Linn., 1758, Syst. Nat., ed. X, p. 362.
See Grouvelle, 1913, for complete synonymy.
Type: from Europe, presumably in the collection of the Linnaean Society of London.

Oval, moderately convex, sparsely pubescent. Piceous, except for clypeus, antennae, margins of pronotum, some small basal elytral spots, and a large apical elytral spot, which are testaceous or rufous. The large apical elytral spot encloses a small piceous spot. Beneath dark rufous. Prothorax with width to length as 1.6 to 1, margins broadly reflexed, moderately arcuate, surface very densely, coarsely punctate. Elytra conjointly with width to length as 1 to 1.1, a little less densely and coarsely punctate than the pronotum. Length 2—3.5 mm.

For an account of the biology of *colon* see Eichelbaum, 1903, All. Zeitschr. Ent., 8: 81. Comparisons with *discoidea* are under the latter species.

This species occurs (April-Sept.) from southeastern Canada to Florida, west to Texas (Dallas, Brownsville), New Mexico, Missouri (Kirkwood), Nebraska (West Pt.), Kansas (Topeka, Lawrence), Iowa (Ames), Oregon (Corvalis) and British Columbia; south into Mexico (Orizaba and Paso de San Juan, Cordova); also northern Eurasia.

Omosita (Saprobia) discoidea (Fabricius)

Nitidula discoidea Fabr., 1775, Syst. Ent., p. 78.
Nitidula cincta Heer, 1841, Fauna Helvetia, **1**, 396.
Omosita inversa Leconte, 1857, Pacific R.R. Rep. App. I, p. 36.
Types: of *discoidea* from England probably in the British Museum (Banksian coll.); of *cincta* from Switzerland in the Ent. Inst. of the Eidgen. Techn. Hochschule at Zurich; of *inversa* from San Jose, California in the M.C.Z. (Leconte coll.).

Oblong oval, moderately convex, rather sparsely pubescent. Above testaceous, except for the head, antennal club, and posterior third of elytra, which are piceous. The posterior third of the elytra encloses several pale spots. Beneath dark rufous. Prothorax with width to length as 1.6 to 1, margins broad, moderately arcuate, surface densely, rather coarsely punctate. Elytra conjointly with width to length as 1 to 1.3, more sparsely and finely punctate than the pronotum. Length 2—3.2 mm.

This species is less oval, more finely punctate, and differently marked from *colon*.

This species occurs (April-Sept.) in Europe, Northern Asia, and from Alaska (Skagway) to southern California (Los Angeles, San Bernadino Mts.), also from Alberta (Edmonton) to New Mexico (Las Vegas Hot Springs); east to Colorado by 1879, to Maryland (Chestertown) by 1899, and to New Jersey and New York by 1930. Possibly *discoidea* was introduced into New Jersey and Maryland directly from Europe.

6. Nitidula Fabricius

Plates 5, 12

Nitidula Fabr., 1775, Syst. Ent. p. 77.
Genotype: *Silpha rufipes* Linn.

Body oblong, head broad, clypeus indistinct, slightly porrect. Antennae a little longer than the head, first segment enlarged, second convex, third long and slender, club large, nearly round in outline. Antennal grooves short and slightly convergent. Labrum feebly bilobed. Mandibles with blunt apices and no secondary teeth. Lacinia broad, rounded at tip, heavily bearded. Maxillary palpi with first segment small, second much larger and clavate, third smaller than the second, fourth cylindrical and about as long as the second. Ligula with large paraglossae; palpi with first segment small, second and third long and about of equal length. Mentum strongly transverse, feebly emarginate in front. Prothorax nearly as broad as the elytra. Elytra long, exposing only the tip of the pygidium; epipleurae broad, nearly attaining the apices. Prosternal process greatly expanded behind the coxae, but not attaining the metasternum. Mesocoxae a little further apart than the procoxae; the metacoxae about twice as far apart as the mesocoxae. Ventral segments about of equal length, first a little longer than the rest. Tarsi feebly dilated; claws simple. Male eighth dorsal segment just visible from behind.

This genus seems nearest to *Omosita*. The beetles breed in carrion and fungi, and in Europe some species are known to be predaceous on Scolytidae.

Nitidula contains ten Holarctic, two Nearctic, and three Neotropical species. Of the American species with Holarctic distribution at least two, and possibly two more, are introduced. The forms vary much in shape, pubescence, and markings.

Key to Nearctic Nitidula

1. Each elytron with one pale spot ..... *bipunctata*
   Elytra plain or with other markings 2
2. Unicolorous above, piceous or black 3
   Elytra maculate or at least paler than pronotum 4
3. Color black ..... *nigra*
   Color piceous (rarely black) ..... *rufipes*
4. Pronotum moderately convex 5
   Pronotum feebly convex, with yellow margins ..... *flavomaculata*
5. Length 3—5 mm. ..... *ziczac*
   Length 1.6—3 mm. ..... *carnaria*

Nitidula bipunctata Linn.

Silpha bipunctata L., 1758, Syst. Nat. ed. X, p. 359.
For complete synonymy see Grouvelle, 1913.
Type: from Europe, probably in the collection of the Linnaean Society of London.

Broadly oval, moderately convex, densely pubescent, color above brown to black, beneath somewhat paler and more rufous; a testaceous or rufous spot on the disc of each elytron near the suture. Prothorax with width to length as 1.7 to 1; sides usually broadly reflexed, moderately arcuate, narrowing anteriorly, posterior angles subrectangular. Head and pronotum densely covered with medium and minute punctures. Elytra conjointly with width to length as 1 to 1.1, finely and sparsely punctate. Prosternum coarsely punctate. Length 3—5 mm.

This species is very variable in color, punctation, and convexity of pronotum. Specimens from Alberta and Alaska are aberrant in being black with orange elytral spots, pronotum less convex and with finer punctation. But these differences are found separately in specimens from other regions.

This species occurs (April-July) from Alaska (McKinley Park) through Yukon (Dawson), Manitoba (Aweme), Ontario (Toronto) to Quebec (Montreal), south to Virginia (Middleton), "Carolina" (Olivier), Kentucky, west to Texas, Missouri (Sedalia), Kansas (Topeka), Iowa, and Minnesota; and south in the west to Oregon.

Nitidula nigra Schaeffer

Nitidula nigra Schaef., 1911, Journ. N. Y. Ent. Soc., **19**, 117.
Type: from Alaska in the Cornell University collection at Ithaca.

Oblong oval, moderately convex, densely pubescent, moderately shining, dark piceous or black, legs rufous. Prothorax with width to length as 1.6 to 1, disc rather flat, margins narrowly reflexed, sides feebly arcuate, narrowing anteriorly, hind angles rectangular, densely covered with medium and minute punctures. Elytra conjointly with width to length as 1 to 1.2, finely and sparsely punctate. Length 3.5—4 mm.

This species is hardly distinguishable from *rufipes* but tends to be black instead of piceous, have the pronotum narrower at apex, its lateral margins more reflexed, and the surface more sparsely punctate. Since both *nigra* and *rufipes* are very variable, these differences do not hold true. However, *nigra* seems to be geographically distinct, and should probably be a subspecies of *rufipes*.

This species occurs (May-Sept.) from Alaska (McKinley Park, Rampart House) through British Columbia (Cranbrook), Yukon (Dawson, White Horse), Alberta (Edmonton, Jasper) to Manitoba (Aweme, Winnipeg). Specimens that are more or less typical have been seen from as far south as Iowa.

Nitidula rufipes (Linn.)

Plate 5, figs. 6–13

Silpha rufipes L., 1767, Syst. Nat., ed. XII, **2** (pt. 2), 573.
For complete synonymy see Grouvelle, 1913.
Type: from Europe, probably in the collection of the Linnaean Society of London.

Oblong oval, moderately convex to rather depressed, moderately densely pubescent, moderately shining, piceous to dark piceous, rarely black, legs paler. Prothorax with width to length as 1.6 to 1, rather depressed or moderately convex, margins narrowly reflexed, sides feebly arcuate, very slightly narrowed anteriorly, hind angles subrectangular, densely covered with medium and minute punctures. Elytra conjointly with width to length as 1 to 1.2, finely and sparsely punctate. Length 2—4 mm.

This species is very variable in degree of convexity, punctation, and pubescence. The American examples tend to be more convex than the European.

This species occurs (April-Sept.) from British Columbia (Peachland, Quesnel Lake) through Manitoba (Winnipeg) to Ontario (Toronto), south to Pennsylvania (Harrisburg), west to Kansas, Wisconsin, Lake Superior (Port Arthur), and Montana.

Nitidula flavomaculata Rossi

Nitidula flavomaculata Rossi, 1790, Fauna Etrusca, **1**, 58.
Nitidula flexuosa Oliv., 1790, Ent., **2**, **7**. Pl. 1, fig. 6.
Type: from Italy, probably in the Berlin Museum.

Oblong oval, moderately depressed, densely and finely pubescent. The color is piceous except for the antennae (except the club), legs, lateral margins of pronotum, a pair of humeral spots, which may or may not be contiguous with a pair of discal elytral spots (which may or may not be contiguous with each other) are testaceous. Prothorax with width to length as 1.5 to 1, lateral margins slightly narrowed anteriorly, very narrowly reflexed, moderately arcuate, more strongly

so at posterior third, hind angles obtuse, surface finely and densely punctate. Elytra conjointly with width to length as 1 to 1.1, more finely and sparsely punctate than the pronotum. Length 3—5 mm.

This species occurs in Europe, North Africa, and the Near East. Recently Dodge, 1939, has reported it from Oakland Co. Oct., 1933) and Alameda Co. (March, 1934), California, also Washington, D. C., April 13, 1934. The writer has seen specimens from California (Mt. Diablo, Altamont, Antioch, Davis, Castro Valley) of which the earliest date is April 1, 1933. C. A. Frost has it from Maine and Massachusetts. Malkin records it from Manasquan Beach, New Jersey (Journ. N. Y. Ent. Soc., 1941). Evidently it has been introduced into the west and east coasts separately and has already become naturalized.

Nitidula ziczac Say

Plate 12, fig. 16

Nitidula ziczac Say, 1825, Journ. Acad. N.S. Philad., **5**, 179.
Nitidula uniguttata Melsh., 1846, Proc. Acad. N.S. Philad., **2**, 106.
Nitidula humeralis Lec., 1859, Proc. Acad. N.S. Philad., p. 70.
Nitidula inornata Horn, 1879, Trans. Amer. Ent. Soc., **7**, 303.
Types: of *ziczac* from Pennsylvania is lost; of *uniguttata* from Pennsylvania in the M.C.Z. (Melsheimer coll.); of *humeralis* from Fort Tejon, California in the M.C.Z. (Leconte coll.); of *inornata* not found in the Philadelphia Acad. of Sciences.

Oblong, moderately convex, densely pubescent. Typically the color is rufo-piceous, the elytra with three longitudinal basal spots and a median sigmoid band testaceous. The elytra markings may be absent or vary in their degree of development. Prothorax with width to length as 1.6 to 1, lateral margins very narrowly reflexed, moderately arcuate, hind angles obtuse. Elytra conjointly with width to length as 1 to 1.2. Pronotum and elytra finely, sparsely punctate. The pubescence over the elytral spots tends to be grey. Length 3—5 mm.

This species is extremely variable. The name *uniguttata* is based on a very small specimen (3.2 mm) with the elytral markings greatly reduced. Leconte's *humeralis* is based on a specimen that is longer and more convex than usual and has only a juxta-humeral spot. Horn's *inornata* is pale piceous and entirely immaculate.

The range of *ziczac* is (April-October) all over the United States north to British Columbia (Peachland), Alberta (Lethridge), Manitoba (Winnipeg), Michigan (Detroit), and New York (Rochester: N. Y. State List); also south into Mexico.

Nitidula carnaria (Schall.)

Silpha carnaria Schall., 1783, Abh. Schrift. Nat. Ges. Halle, **1**, 257.
For complete synonymy see Grouvelle, 1913.
Type: from Europe, unknown to the writer.

Oblong oval, moderately convex, densely pubescent, piceous with two pale spots on each elytron. These spots may be obsolete. Prothorax with width to length as 1.8 to 1, lateral margins very narrowly reflexed, apex very slightly narrower than the base, sides moderately arcuate, hind angles obtuse, surface very densely covered with small and minute punctures. Elytra conjointly with width to length as 1 to 1.2, more finely and sparsely punctate than the pronotum. Length 1.6—3 mm.

This is a Palaearctic species which has been introduced into the United States. Although there is a specimen from "Utah" in the Leconte collection, the first definite record seems to be a specimen in the writer's collection from New York, July 14, 1894. It has since been found (April-October) from Massachusetts (Cambridge, Lynn Beach) to New Jersey (Manasquan Beach) and Pennsylvania (Easton), west to Michigan and Wisconsin; also California (Oakland).

7. Prometopia Erichson

Plates 5, figs. 14–21; pl. 12, fig. 17

Prometopia Erichson, 1843, in Germar, Zeitschr. für Ent., **4**, 279. Genotype: *Nitidula sexmaculata* Say.

Body large, oval, depressed. Head large, clypeus indistinct. Antennae longer than the head, first segment convex, second short and convex, third slender and very long as long as next three together, fourth to eighth short and about of equal length, ninth triangular, club elliptical. Labrum nearly semicircular, feebly bilobed. Mandibles prominent, bifid at tip, and a tooth behind the apex. Lacinia slender, rounded at tip, with a short beard. Maxillary palpi long and slender, first segment small, second longer and clavate, third longer, and fourth slender and about as long as the first three. Ligula with small paraglossae; palpi long and slender, first segment minute, second longer than the third. Mentum large, semi-circular, anteriorly with a small deep emargination. Pronotum deeply emarginate anteriorly, sides broadly explanate, as wide as the elytra. Scutellum small and broad. Elytra entire, covering the pygidium; epipleurae very broad, attaining

the apices. Prosternal process flat, greatly widened behind the coxae, truncate posteriorly. Mesocoxae twice as far apart as the procoxae, metacoxae slightly more separated than the mesocoxae. First ventral segment as long as next two together, second to fifth about of equal length. Femurs broad and flat. Tarsi very feebly dilated. The male eighth dorsal segment visible only from beneath. Claws simple.

Prometopia is related to the Palaearctic *Ipidia* and the Oriental *Parametopia* but is not very near any Nearctic genus.

The genus contains 24 species and is lacking in the Palaearctic region. Only two species, evidently of Neotropical origin, are Nearctic.

Body oval, elytra maculate ..... *sexmaculata*
Body oblong-oval, elytra unicolorous ..... *bidentata*

Prometopia sexmaculata (Say)

Nitidula sexmaculata Say, 1825, Journ. Acad. N.S. Philad., **5**, 178.
Type: from eastern United States is lost, but there is an autotype from Milton, Mass., May 2, 1829 in the T. W. Harris collection now on deposit in the Museum of Comparative Zoölogy.

Broadly oval to oblong oval, depressed, moderately shining, very finely and sparsely pubescent, pale to dark piceous, margins rufous, each elytron with an irregular H-shaped basal spot and a round spot at apical third rufous, beneath dark rufous. Prothorax twice as wide as long, narrower in front, apex deeply emarginate, base truncate, sides feebly arcuate, hind angles subrectangular, margins broadly explanate, surface covered with rather coarse and very fine punctures intermixed, each puncture bearing a short hair. Elytra conjointly as wide as long in the male, slightly longer than wide in the female, surface rather coarsely punctate, each puncture bearing a short hair. Length 4.5—6.5 mm.

This species occurs at sap (April-Sept., chiefly in July) from New Hampshire (Farmington, Rumney) to Florida, west to Texas (Dallas, Anahuac), Missouri (St. Louis), Kansas (Douglas Co., Topeka), and Iowa (Iowa City); also Santa Barbara, California (U.S.N.M.). Specimens from Beeville, Texas and St. Louis, Missouri (U.S.N.M.) are aberrant in being more oblong, as in *bidentata*. It hibernates beneath logs and under bark.

Prometopia bidentata Schaeffer

Prometopia bidentata Schaef., 1909, Sci. Bull., Mus. Brooklyn Inst., **1**, 375.
Type: no. 42,561 from Arizona (Huachuca Mts.) in the U.S.N.M.

More elongate than *sexmaculata* Say; feebly pubescent; above unicolorous piceous, margins of thorax and elytra pale, legs, antennae, and underside ferruginous. Head coarsely punctate with smaller punctures intermixed. Prothorax twice as wide as long, sides slightly arcuate, narrowing anteriorly, apex less deeply emarginate than in *sexmaculata*, base truncate, hind angles rectangular, margins less widely explanate than in *sexmaculata*, surface covered with intermixed coarse and fine punctures. Elytra slightly longer than wide, sides feebly narrowing to apex, apices separately rounded, margins explanate and slightly reflexed, surface confusedly punctate. Prosternum and metasternum coarsely punctate; abdomen more finely punctate. Middle and hind femora obtusely bidentate. Length 6 mm.

This species differs from *sexmaculata* in being more slender, unicolorous, having narrower margins, and different femora. There is nothing like it in the British Museum.

Aside from the type, *bidentata* is known from a specimen in the California Academy of Sciences from 6000 ft., Mt. Washington, Nogales, Arizona, July.

8. Lobiopa Erichson

Plates 5, 13

Lobiopa Er., 1843, in Germar, Zeitschr. für Ent., **4**, 291.
Cerophorus (pars) Castelnau, 1840, Hist. Nat. Col., **2**, 10.
Soronia (pars) Reitter, 1873, Verh. Nat. Ver. Brünn., **12**, 46. Horn, 1879, Trans. Am. Ent. Soc., **7**, 306. Genotype: *Lobiopa cimicina* Er.

Body oval, large, depressed. Head large, clypeus indistinct, front lobed over the insertion of the antennae. Antennae a little longer than the head, first segment very greatly widened anteriorly, second short convex, third elongate about as long as next three together, fourth to eighth short, ninth triangular, club oval. Antennal grooves parallel. Labrum feebly bilobed. Mandibles prominent, bifid at tip, no tooth behind the apex. Lacinia short, rounded at tip, heavily bearded. Maxillary palpi with first segment small, third short, second and fourth long about of equal length. Ligula with large paraglossae, palpi incrassate, first segment minute, second clavate, third oval about as long as second. Mentum rectangular, bisinuate anteriorly. Pronotal margins broadly explanate; pronotum about as wide as the elytra. Scutellum small and transverse. Elytra entire, covering the pygidium. not costate; epipleurae not extending around the apices. Prosternal process greatly expanded behind the coxae, truncate posteriorly.

Mesocoxae as far apart as procoxae, metacoxae slightly further apart, First ventral segment as long as next two together, second to fifth about of equal length. Femurs broad; tarsi very feebly dilated. Claws simple. The male eighth dorsal segment visible only from beneath.

Lobiopa is most closely related to *Soronia* but is related also to *Prometopia.*

The genus *Lobiopa* contains about 25 species in the New World and one at Cape of Good Hope. The species are found at sap and fungi or under bark.

Key to Nearctic Lobiopa

1. Six or seven distinct rows of setae on the disc of each elytron 2
   About nine distinct rows of setae on the disc of each elytron . . *setosa*
2. From above, eyes not as long as pronotal emargination is deep 3
   From above, eyes as long or longer than pronotal emargination is deep 5
3. Distinctly less than twice as long as wide 4
   Twice as long as wide . . . . . *oblonga*
4. Submentum finely punctate, length 3.6—5.3 mm . . . . . *undulata*
   Submentum coarsely punctate, length 5.3—6.7 mm . . . . . *falli*
5. Above with pubescence, setae, and coarsely punctate, length more than 4.4 mm 6
   Above nearly glabrous, finely punctate, length 3.5—4.5 mm . . . . . *brunnescens*
6. Lateral margins narrowly explanate . . . . . *punctata*
   Lateral margins broadly explanate . . . . . *insularis*

Lobiopa setosa Harold

Lobiopa setulosa Leconte (non Erichson), 1863, Smiths. Misc. Coll. **6**, 63.
Lobiopa setosa Harold, 1868, Col. Hefte, **4**, 104.
Soronia undulata (pars) Horn, 1879, Trans. Amer. Ent. Soc., **7**, 307.
Soronia substriata Hamilton, 1893, Can. Ent., **25**, 306.
Types: of *setosa* from Illinois (no. 6972) in the M.C.Z. (Leconte coll.); of *substriata* from Allegheny, Pennsylvania in the Carnegie Museum.

Broadly oval, depressed, finely pubescent, upper surface setaceous, above piceous with margins testaceous and discs of pronotum and elytra with irregular testaceous maculae, beneath dark rufous. Head rather finely densely punctate, pubescent and setaceous, shallowly bi-impressed between the eyes. Eyes not as long as pronotal emargination is deep. Pronotum with very broadly explanate, feebly arcuate

lateral margins, hind angles subrectangular, surface closely, rather finely punctate, finely pubescent, sparsely setaceous, the distal half of each seta recurved posteriorly. Prosternal process particularly broad between the coxae. Scutellum transverse. Elytra with broadly explanate, evenly arcuate margins, surface moderately densely and finely punctate; nine more or less distinct rows of setae on each elytron. Beneath finely punctate, finely pubescent. Length 5—6.5 mm., width 3.2—3.5 mm.

This rare species tends to be broader, more depressed, duller, and darker than its closest relative *undulata*. This species occurs (March 21-November) in Massachusetts (Chicopee, Brookline), New York (Staten Island), Pennsylvania (Alleghenny), Washington, D. C., Virginia (Fall's Church), North Carolina, Illinois (Fairbury), Michigan (Detroit), Utah, Washington (Prescott), and British Columbia (Kamloops). In Penn. it was found in May under bark of *Acer rubrum*.

Lobiopa oblonga Parsons

Lobiopa oblonga Pars., 1938, Psyche, **45**, 159, fig. 6.

Type: from Marble Fork Bridge, 3000–5000 ft., Sequoia National Park, California, June 12, 1929; and male allotype, Upper Soda Spring, Siskiyou County, California, Aug. 6, 1906 in the Calif. Acad. Sci. (Van Dyke coll.).

Length twice the width, oblong, oval, feebly convex. Above dull rufo-piceous with faint, irregular, pale maculae. Margins of thorax and elytra rufo-testaceous. Beneath, including antennae and legs, dark rufo-testaceous. Head pubescent; closely, finely punctate; very broadly, shallowly impressed between the eyes. The lobes over the insertion of the antennae more prominent than in all the other North American species except *falli*. Prothorax more emarginate anteriorly than in *brunnescens* but less so than in the other North American species; with broadly explanate, feebly arcuate lateral margins; hind angles rather broadly rounded; hind margin feebly bisinuate; surface closely finely punctate, finely pubescent, sparsely covered with short pale setae. Prosternal process relatively more narrow between the coxae than in the other species. Visible part of scutellum forming an equilateral triangle. Elytra with broadly explanate, feebly arcuate margins; closely, finely punctate; finely pubescent; each elytron with six or seven rows of pale setae. Beneath closely, finely punctate, rather sparsely pubescent. Length of holotype 5 mm., width 2.5 mm.; allotype 4.2 mm., width 2.2 mm.

This species, apparently closest to *falli*, is distinctive in its oblong

form. It is less convex than *brunnescens, punctata,* and *falli* but more convex than the other species.

This species occurs (June-August) in California. In addition to the two types, there are three specimens in the U.S.N.M. (Lake Tahoe, Idyllwild in the San Jacinto Mts., and one reared Jan. 17 from *Libocedrus decurrens* at Placerville).

Lobiopa undulata (Say)

Plates 5, figs. 22–28; pl. 13, fig 1

Nitidula undulata Say, 1825, Journ. Acad. N.S. Philad., **5**, 179.
Soronia undulata Horn, 1879, Trans. Amer. Ent. Soc., **7**, 307.
Lobiopa undulata Sharp, 1890, Biol. Centr.-Amer. Col., **2**, pt. 1, p. 321.
Type: from eastern United States is lost.

Broadly oval, feebly convex, feebly shining, finely sparsely pubescent. Above piceous, with more or less faint irregular testaceous maculae. Margins of thorax and elytra testaceous. Beneath, including antennae and legs, rufous. Head not densely punctulate; front shallowly, semicircularly impressed. Prothorax twice as wide as long; sides flatly arcuate; hind angles broadly rounded, the angle itself small, distinct, and retracted; base feebly bisinuate, surface moderrately densely, finely punctate at middle, less densely at sides. Elytra slightly wider than the prothorax, humeral angles feebly dentiform, each elytron with 7 or 8 rows or setae which are strongly, regularly recurved backwards, surface more coarsely punctate than the pronotum. Beneath finely, sparsely punctate. Length 3.6—5.3 mm., width 2.3—3.1 mm.

This species varies considerably in color, shape, and size. It is found at sap in the spring and autumn and hibernates beneath logs.

This species occurs (April-Oct., chiefly in the spring at sap) from Maine to Florida, west to Texas (Harris Co., Alpine, Kerryville, San Diego), Missouri (Mackenzie City), Nebraska (West Pt.), Kansas (Wilson Co., Topeka), Iowa (Burlington), and Manitoba; also a series labelled "Cal." (U.S.N.M.). Sharp's record of *undulata* from "northern Sonora" must be *falli,* since there is Biologia material labelled "Mex." in the B. M. which is *falli.*

Lobiopa falli Parsons

Lobiopa falli Pars., 1938, Psyche, **45**, 161, fig. 7.
Type: from Arizona in the M.C.Z. (Leconte coll.).

More oval than oblong; feebly convex. Above dull rufo-piceous with the margins of the prothorax and elytra rufo-testaceous. Also

there are on the upper surface faint, irregular, pale maculae, in particular usually a transverse pale band at the posterior third extending half way across each elytron. This band is more evident in *insularis* and *undulata*. Beneath rufo-piceous with the legs paler. Head with a few, thick, erect setae; pubescent; rather coarsely compactly punctate; alutaceous; with a broad, transverse impression between the eyes; lobes over the insertion of the antennae very prominent, more so than in the other North American species. Eyes of ordinary size. Prothorax as emarginate anteriorly as in *setosa* and *undulata*, more so than in *insularis* in which the prothorax is more emarginate than in *oblonga*. Prothorax with lateral margins broadly explanate, evenly and flatly arcuate, narrowing shortly before the acute hind angles; hind margin distinctly bisinuate; surface closely and rather coarsely punctate, alutaceous, pubescent, sparsely covered with thick setae. Visible part of scutellum forming a strongly transverse triangle. Elytra with broadly explanate margins; rather close, coarse, obsolete punctures; alutaceous; finely pubescent; each elytron with about seven rows of thick setae. Beneath coarsely punctate, sparsely and finely pubescent. Length 5.3—6.7 mm., width 3.1—4.1 mm.

This species varies in outline and in color. In the pale specimens the maculation is most evident, whereas in those that are piceous the maculation is not discernible. The species is distinctive in the prominent lobes over the insertion of the antennae, transverse scutellum, and the unusual covering of thick setae. It is apparently related to *undulata*; in fact there are specimens from Texas in the Fall collection which approach *falli* in the maculation, setae, and frontal lobes. But in *falli* the scutellum is more transverse, punctures beneath more coarse, and shape usually more oval.

The range of *falli* is central and southern Arizona east to Alpine, and Chisos Mts., Texas (May-August).

Lobiopa brunnescens (Blatchley)

Soronia brunnescens Blatch., 1917, Can. Ent., **49**, 238.
Type: from Dunedin, Florida (June 10) at Purdue University (Blatchley coll.) and a paratype is in the U.S.N.M.

Oblong, oval, moderately convex. Uniformly pale reddish-brown, legs slightly paler. There may be a trace of maculation which is like that of *insularis*. Head finely, sparsely punctate, broadly impressed between the eyes. Prothorax two-thirds wider than long, apex broadly and shallowly emarginate; sides flatly, evenly arcuate, hind angles

obtuse, lateral margins moderately broadly explanate, surface sparsely and evenly punctate. Elytra slightly wider than the prothorax, margins evenly arcuate and more broadly explanate than the pronotum, punctate like the pronotum, surface glabrous. Abdomen minutely pubescent, finely and densely punctate. Length 3.5 mm.

Specimens from Louisiana have the pronotum slightly more coarsely punctate than in the types. See under *punctata* for comparisons with the nearest relative of *brunnescens*. Aside from the type locality *brunnescens* is known from Covington, Louisiana, June 13 and Martha's Vineyard, Mass., Aug. 31, 1931 in the New England Museum of Natural History.

Lobiopa punctata Parsons

Lobiopa punctata Pars., 1938, Psyche, **45**, 163, fig. 4.
Type: from Miami, Florida in the M.C.Z. (Fall coll.).

Oblong oval, rather strongly convex, shining, rufo-testaceous above and beneath. Head sparsely pubescent, closely, coarsely punctate; broadly impressed between the eyes; frontal lobes more transverse than in the other North American species. Prothorax as emarginate in front as *brunnescens*, therefore less emarginate than in the other North American species; lateral margins narrowly explanate and evenly arcuate; hind angles broadly rounded, the angle itself obtuse; hind margin feebly bisinuate; surface closely, coarsely punctate, with sparse pubescence and sparser small setae. Prosternal process only slightly reflexed behind the coxae. Elytra with narrowly explanate, feebly arcuate lateral margins; eight rows of small setae on each elytron; finely pubescent; each elytron with two pale spots extending across anterior median angle, a transverse pale band across inner half at posterior third, and center somewhat darker. Beneath closely, coarsely punctate, finely pubescent. Length 5.2—4.5 mm., width 3.1—2.5 mm.

Described from four males; holotype and paratype from Miami, Florida, March 11, 1924 in the M.C.Z. (Fall coll.); one paratype from Miami, Florida, March 31, in the Calif. Acad. Sci. (Van Dyke coll.); and a paratype from Balaclava, Jamaica, A. E. Wright in the M.C.Z.

This species is apparently closest to *brunnescens*, particularly in the convexity of the body, and degree of emargination of the pronotum. It differs from *brunnescens* in its larger size, much coarser punctation and pubescence, narrower lateral margins, and in the prosternal process being only slightly arched longitudinally between the coxae; whereas

in *brunnescens* the prosternal process is strongly arched between the coxae and reflexed posteriorly.

Lobiopa insularis (Castelnau)

Nitidula insularis Cast., 1840, Hist. Nat. Col., **2**, 10 (*Cerophorus*).
Lobiopa contaminata Er., 1843, in Germar, Zeitschr. für Ent., **4**, 296.
Lobiopa decumana Er., loc. cit., p. 295.
Lobiopa dimidiata Er., loc. cit., p. 295.
Lobiopa grandis Er., loc. cit., p. 294.
Types: of *insularis* from Cuba probably in the Paris Museum; of *contaminata* (Brazil), of *decumana* (Cuba), of *dimidiata* (St. Thomas, Antilles, Colombia), of *grandis* (Para, Brazil) all in the Berlin Museum.

Oval, feebly convex, moderately shining, finely sparsely pubescent. Color dark rufous except that the discs of the pronotum and elytra are piceous broken by rufous spots, particularly by a pale band. Head very shallowly, semicircularly impressed between the eyes, sparsely, rather coarsely punctate. Prothorax nearly twice as wide as long, lateral margins broadly explanate, feebly arcuate, hind angles obtuse, hind margin feebly bisinuate, surface rather coarsely, sparsely punctate, disc covered with straight, subclavate setae. Elytra more vaguely, coarsely punctate than the pronotum, margins broadly explanate, each elytron with 7 rows of nearly straight, obliquely set, subclavate setae. Beneath very finely sparsely punctate. Length 5—6.5 mm., width 3.2—4.1 mm.

As the synonymy indicates, *insularis* is a highly variable species. It is more shining than usual, has distinctive setae, and is more oval than *undulata*.

This species occurs (May-November) from Georgia (Savannah, Valdosta) to Florida (Orange Co.), west through Alabama (Mobile, Kushla) to Texas (Harris Co., Brownsville), south through Central America and the West Indies to Colombia and Brazil.

9. Soronia Erichson

Plate 6

Soronia Er., 1843, in Germar, Zeitschr. für Ent., **4**, 277.
Genotype: *Nitidula punctatissima* Illiger. (cf. Plate 6, figs. 1–7).

Oblong, oval, large, depressed. Head large, clypeus indistinct, front lobed over the insertion of the antennae. Antennae longer than the head, first segment greatly widened anteriorly, second short convex,

third elongate about as long as fourth and fifth together, sixth to eighth short, ninth trapezoidal, club oval. Antennal grooves strongly convergent posteriorly. Labrum large, feebly bilobed or emarginate. Mandibles with simple apex, an acute cusp behind the tip, bearded. Lacinia short, rounded at tip, and heavily bearded. Maxillary palpi with first segment small, second long, slightly clavate, third short, fourth as long as the second and third together. Ligula with large paraglossae, palpi incrassate, first segment minute, second subclavate, third enlarged, longer than the second. Mentum transverse, bisinuately emarginate in front. Pronotal margins broadly explanate; pronotum about as wide as the elytra. Visible part of scutellum small, not very transverse. Elytra entire, covering the pygidium, feebly costate, epipleurae may extend to the suture. Prosternal process greatly expanded behind the coxae, truncate posteriorly. Mesocoxae as far apart as procoxae, metacoxae twice as far apart as mesocoxae. First ventral segment not as long as the next two together, second to fifth about of equal length. Femurs broad, tarsi very feebly dilated, claws simple. The male eighth dorsal segment small, visible from beneath.

Soronia is nearest to *Lobiopa* but is more oblong, and has different antennal grooves, mentum, antennae, etc.

The genus *Soronia* contains about 30 species, generally distributed in the Old World, but only three species are known from the New World, one each from North America, Brazil, and Mexico to Brazil. In temperate regions at least the beetles occur at sap under the bark of deciduous trees.

Soronia guttulata (Leconte)

Lobiopa guttulata Lec., 1863, Smiths. Misc. Coll., **6**, 64.

Type: described from a specimen collected by Ulke in Illinois. In the Leconte collection (M.C.Z.) there is no specimen from Illinois but there is one from Canada bearing the Leconte's name label and labelled "type, 6970.

Elongate oval, feebly convex, feebly shining, finely, sparsely pubescent. Dark rufous, head and discs of the pronotum and elytra piceous, broken by more or less vague pale maculae, particularly a testaceous band across inner half of each elytron at posterior three-fifths. Head with sinuous impression between the eyes, rather densely, finely punctate. Prothorax slightly less than twice as wide as long, narrowed in front, apex broadly, rather deeply emarginate, margins broadly explanate, feebly arcuate, slightly sinuate just before the sub-rectangu-

lar hind angles, base feebly bisinuate, disc with about four vague foveae on each side and sometimes a median impression, surface moderately densely finely punctate. Elytra slightly broader than the prothorax, margin moderately broad, slightly reflexed, each elytron with about five vague costae, surface more sparsely punctate than the pronotum. Beneath densely punctate, prosternum sparsely punctate. Length 5—6 mm., width 2.8 mm.

This rare species occurs usually under the bark of *Pinus ponderosa* (April-Oct.) in Canada (probably Ottawa), New York, Pennsylvania, Michigan, Iowa, Montana (Columbia Falls, reared Oct. 24 at Lamedeer), Idaho (Stiles, Smith's Ferry), Colorado (Evergreen), Nevada, Arizona (Santa Catalina Mts.), California (McCloud, Carrville, Facht, Lookout, Monterey Co., Jan. 6, under bark of *Pinus radiata*).

10. Phenolia Erichson

Plates 6, figs. 8–15; pl. 12, fig. 18

Phenolia Erichson, 1843, in Germar, Zeitschr. für Ent., **4**, 299.
Genotype: *Nitidula grossa* Fabr.

Elongate oval, moderately convex, large. Head large, feebly impressed between the eyes, clypeus indistinct, front not lobed over the insertion of the antennae. Antennae longer than the head, first segment strongly convex, widened anteriorly but not auriculate, second short but only slightly more convex than the next, third to eighth becoming progressively shorter, club abrupt and compact. Antennal grooves deep, parallel. Labrum feebly bilobed. Mandibles bifid at tip, not toothed on inner side, feebly bearded. Lacinia short, rounded at tip, heavily bearded. Maxillary palpi with first segment small, second clavate, third short, fourth as long as second and third together. Paraglossae short and transverse, palpi incrassate, first segment minute, second clavate, third as long as the second and thick. Mentum feebly, bisinuately emarginate in front. Pronotal margins broadly explanate; pronotum not as wide as the elytra. Scutellum small, not strongly transverse. Elytra entire, covering the pygidium; feebly costate; epipleurae extending to the apex of the elytra but not to the suture. Prosternal process broad between the coxae, expanded and truncate behind. Procoxae and mesocoxae equally far apart, metacoxae twice as far apart as the mesocoxae. First ventral segment as long as the next two together, second to fifth of equal length. Anterior tarsi feebly, middle more feebly, and posterior very feebly dilated. Claws simple. Male eighth dorsal segment visible only from beneath.

Phenolia is most closely related to *Soronia*. Unfortunately the Madagascan *Ornosia* and *Idosoronia* are unknown to the writer.

The genus *Phenolia* consists only of one eastern Nearctic species, found beneath bark and in fungi.

Phenolia grossa (Fabricius)

Nitidula grossa Fabr., 1801, Syst. Eleuth., **1**, 347.
Type: from "Carolina" presumably in the Paris Museum (Bosc coll.).

Elongate oval, nearly glabrous, feebly shining, moderately convex. Dark rufo-piceous, elytra, except margins, darker with rufous spots. Head with very coarse, shallow punctures. Prothorax less than twice as wide as long, apex a little narrower than base, margins broadly explanate, slightly reflexed, moderately arcuate, slightly sinuate before the subrectangular hind angles, base feebly bisinuate, disc faintly impressed on each side of middle, alutaceous, coarsely and finely punctate. Elytra with rather narrow margins, each elytron with seven feeble costae, a row of fine punctures, each bearing a short hair, along each costa, the intervals vaguely, biseriately, coarsely punctate. Beneath densely, prosternum less densely, punctate. Length 6—8.5 mm.

This species occurs (April-Sept.) from Ontario (Toronto) and Maine to North Carolina (Asheville, Retreat), and Alabama (Wadley), west to Texas, Missouri (St. Louis), Arkansas (Hope), Iowa (Mt. Pleasant, Guttenberg), and Minnesota (Itaska Park); also Wyoming.

11. Amphotis Erichson

Amphotis Er., 1843, in Germar, Zeitschr. für Ent., **4**, 290.
Soronia (pars) Horn, 1879, Trans. Amer. Ent. Soc., **7**, 287.
Genotype: *Nitidula marginata* Fabr.

Elongate oval, moderately convex, large. Head moderately large, clypeus indistinct, front broadly lobed over the insertion of the antennae. Antennae as long as the head, first segment strongly convex, widened anteriorly but not auriculate, second short and convex, third narrow, third to eighth progressively more convex and shorter, club rather small, oval, compact. Antennal grooves deep, parallel. Labrum large, feebly bilobed. Mandibles with simple apex, an acute cusp behind the tip, feebly bearded. Lacinia short, rounded at tip, heavily bearded. Maxillary palpi with first segment minute, second short and clavate, third slightly shorter than the second, fourth as long as the first three together. Ligula with very small paraglossae,

palpi moderately incrassate, first segment minute, second clavate, as long as the third. Mentum deeply emarginate and strongly bisinuate in front. Pronotal margins broadly explanate; pronotum nearly as wide as the elytra. Scutellum small, moderately transverse. Elytra entire, covering the pygidium, costate; epipleurae extending to the suture. Prosternal process greatly expanded behind the coxae, truncate posteriorly. All the coxae equally far apart. First ventral segment at middle as long as the next two together, second to fifth about of equal length. Tarsi very feebly dilated; claws simple. Male eighth dorsal segment small, visible from beneath.

Grouvelle places *Amphotis* among tropical Old World genera unknown to the writer.

The genus contains three Palaearctic and two Nearctic species, which are mainly myrmecophilous, but are also found under bark at fungi or on flowers.

Each elytron with six long costae ..... *ulkei*
Each elytron with eight long costae ..... *schwarzi*

Amphotis ulkei Leconte

Plates 7, figs. 1–8; pl. 13, fig. 2

Amphotis ulkei Lec., 1866, Proc. Acad. N. S. Philad., p. 376.
Soronia ulkei Horn, 1879, Trans. Amar. Ent. Soc., **7**, 307.
Type: lectotype no. 6971 from Washington, D. C. and a cotype from Massachusetts in the M.C.Z. (Leconte coll.); cotype presumably in the Carnegie Museum (Ulke coll.).

Elongate oval, depressed, feebly shining, nearly glabrous. Testaceous to chestnut brown, sometimes a faint rufous band on elytra at posterior three-fifths; discs of pronotum and elytra tending to be darker. Head not impressed, densely rather finely punctate. Prothorax one and one-half times as broad as long, narrowed in front, apex very deeply emarginate, base very feebly bisinuate, margins broadly explanate, feebly arcuate, hind angles subrectangular, surface densely, rather finely punctate, sometimes very sparsely pubescent. Elytra slightly wider than the pronotum; humeral angles slightly dentiform; margins broad and reflexed; with a sutural and five discal costae; along each costa is a row of fine punctures each of which bears a pale, recumbent hair; the intervals irregularly, transversely, coarsely punctate; margin more sparsely and finely punctate. Beneath densely, prosternum less densely, punctate. Length 6–7.5 mm.

This species occurs (April–Oct.) from Massachusetts (West Chop, Tyngsboro, Springfield) to North Carolina (Welton) and South

Carolina (Long Creek); also "Texas" (U.S.N.M.) in the nests of *Formica schaufussi, F. integra, F. truncicola obscuriventris,* and *Crematogaster lincolata.* It is strictly myrmecophilous in the early spring but in the fall of the year is found in decaying fungi.

Amphotis schwarzi Ulke

Amphotis schwarzi Ulke, 1887, Ent. Amer., **3**, 77.
Type: from Ft. Monroe, Virginia (June 17) in the Carnegie Museum (Ulke coll.).

Similar to *ulkei.* Color testaceous to dark rufo-piceous. Differs from *ulkei* as follows: somewhat less oval, smaller, sides of prothorax more flatly arcuate, margins of elytra more narrow and less reflexed, eight instead of six elytral costae, and the mentum narrower and less emarginate in front. Length 5–5.2 mm.

This species occurs (June, Dec., Feb., March) from Virginia (Ft. Monroe) through North Carolina (Southern Pines), South Carolina, Georgia (Atlanta), to Alabama (Spring Hill, Mobile, Langdale, Chambers Co.).

12. Thalycra Erichson

Plate 7, figs. 9–16; pl. 13, fig. 4

Thalycra Er., 1843, in Germar, Zeitschr. für Ent., **4**, 305.
Genotype: *Nitidula fervida* Oliv.

Oblong oval, moderately small, convex, sparsely pubescent. Head moderately small, clypeus indistinct, prolonged at middle, sides parallel; front not lobed or impressed. Antennae longer than the head, first segment strongly convex, second short, convex, as long as the third, fourth to seventh shorter, eighth short and very strongly transverse, club strongly convex, nearly round, and closely coadapted. No antennal grooves distinctly defined. Labrum large, bilobed. Mandibles with simple apex, a large, acute cusp behind and sometimes very near the tip, feebly bearded. Maxillary palpi with first segment minute, second rather short and clavate, third shorter than the second, and the fourth tapering as long as the second and third together. Ligula with large laterally projecting paraglossae, palpi incrassate, first segment small, second long and clavate, third a little longer than the second, oval, truncate at tip. Mentum rectangular; feebly, arcuately emarginate in front. Prothorax nearly as broad as the elytra, margins very narrow. Elytra entire, exposing only the tip

of the pygidium. Scutellum rather large, triangular. Epipleurae extend to the elytral apices. Prosternal process expanded and strongly reflexed dorsad behind the coxae. Mesosternum not carinate. Coxae all about equidistant. First ventral segment about as long as next two together. Fifth ventral segment nearly as long as preceding two, segments two to four of equal length. Anterior tibiae triangularly dilated (less so in the female), the outer apical angle dentiform; middle and posterior tibiae spinulose externally and at tip. Anterior tarsi very broadly dilated, middle less broadly and the posterior tarsi feebly dilated. Claws simple. Male eighth dorsal segment small, visible from behind.

Thalycra is very closely related to *Perthalycra*. Comparisons will be found under the latter genus. It is also closely related to *Xenostrongylus, Neothalycra, Thalycrodes,* and perhaps other genera.

The genus is found by sweeping grass and flowers in late afternoon, also at sap under bark, or in fungi.

Thalycra contains one species in north and middle Europe and one very rare species in the United States and Canada.

Thalycra concolor Leconte

Thalycra concolor Lec., 1850, in Agassiz, Lake Superior, p. 223.
Type: no. 6980 from the north shore of Lake Superior in the M.C.Z. (Leconte coll.).

Oblong oval, convex, moderately shining, sparsely pubescent. Color uniformly rufo-ferruginous. Head sparsely punctate in the center. Prothorax a little less than twice as wide as long, narrower in front, base very feebly bisinuate, apex very feebly emarginate, lateral margins very narrow, finely fimbriate, hind angles obtuse, surface densely, rather finely punctate. Elytra conjointly with width to length as 1 to 1.2, margins finely fimbriate, surface as coarsely punctate as the pronotum but less densely, the punctures becoming rapidly finer until they are obsolete near the apex. Prosternum very sparsely finely punctate. Mesosternum and abdomen coarsely and moderately densely punctate. Length 3.2–3.5 mm.

This species is very near the European species and would be considered the same as *fervida* if the two species were not so completely isolated from each other. However, *concolor* is somewhat more sparsely punctate and the elytra are slightly more attenuate apically.

In addition to the male type, the writer has seen a specimen from

Det[roit, Michigan], September in the U.S.N.M. Ulke, 1902, records one specimen from the District of Columbia; presumably it is in the Carnegie Museum (Ulke coll.).

13. Perthalycra Horn

Plates 7, figs. 9–16; pl. 13, fig. 5

Perthalycra Horn, 1879, Trans. Amer. Ent. Soc., **7**, 309.
Genotype: *Perthalycra murrayi* Horn.

Similar to *Thalycra* but differing as follows. Clypeus is a little more distinct. Antennae with eighth segment not so strongly transverse; club more abrupt and compact. Anterior tibiae more slender apically, with apical margin dentate posteriorly, anterior margin more or less distinctly bidentate at middle; middle and posterior tibiae more strongly spinulose. Lacinia is relatively longer and the mentum is less emarginate in front. Anterior tarsi moderately dilated in the male only; middle and hind tarsi not dilated.

Perthalycra is very closely related to *Thalycra* since most of the differences are hardly of generic importance.

The habits are probably the same as in *Thalycra*.

Apical angle of anterior tibiae bifid ..... *murrayi*
Apical angle of anterior tibiae simple ..... *carolina*

Perthalycra murrayi Horn

Perthalycra murrayi Horn, 1879, Trans. Amer. Ent. Soc., **7**, 310.
Type: from San Francisco, California, Oregon, and western Nevada, cotypes in the M.C.Z. (Leconte coll.) and the Philadelphia Acad. of Nat. Sciences.

Oblong oval, convex, feebly shining, sparsely pubescent. Color usually castaneous but may be pale testaceous or piceous. Head and pronotum densely, moderately coarsely punctate. Prothorax with width to length as 1.5 to 1, narrowed in front, apex feebly emarginate, sides very narrowly margined, moderately arcuate, finely fimbriate, hind angles obtuse, surface densely, rather coarsely punctate. Elytra conjointly with width to length as 1 to 1.2, apices feebly truncate, margins finely fimbriate, surface more sparsely and finely punctate than the pronotum. Beneath moderately densely punctate; the prosternum very sparsely punctate. Length 3–5 mm.

Although *murrayi* varies considerably in size, color, convexity, and punctation, all gradations are apparent. An example in the Fall collection has the prosternum rather densely punctate.

This species occurs (May–Sept.) from British Columbia (Kaslo) and Alberta (Jasper) through Montana (Gallatin Co., Bear Paw Mts., Cooke), Idaho, Washington (Longmire, Mt. Bonaparte, Lake Crescent), Oregon, to California (generally distributed), Nevada (Lake Tahoe), Arizona (Prescott, McNary, 7200 ft., White Mts., Gila Co., 7200–11000 ft.), New Mexico (Rincau, Pecos, Las Vegas Hot Springs), Colorado (Copeland Park, Boulder Co.), and Wyoming (Nat. Park).

Perthalycra carolina Wickham

Perthalycra carolina Wickham, 1920, Proc. Ent. Soc. Wash., **22**, 233.
Type: no. 23,727 from Southern Pines, North Carolina and paratype from Pensacola, Florida in the U.S.N.M.

Oblong oval, convex, moderately shining, sparsely pubescent. Color yellowish testaceous to castaneous. Sometimes the head is darker and rarely each elytron has an obsolete, dark, discal spot. Head sparsely, finely punctate. Prothorax with width to length as 1.7 to 1, narrowed in front, apex feebly emarginate, sides very narrowly margined, moderately arcuate, finely fimbriate, hind angles obtuse, surface sparsely, rather finely punctate. Elytra conjointly with width to length as 1 to 1.3, margins fimbriate, slightly more sparsely punctate than the pronotum. Beneath sparsely punctate; prosternum smooth (sparsely punctate in the Maryland specimen). Length 3.5–4.5 mm.

This species differs from *murrayi* in the apical angle of the anterior tibiae being simple not bifid (feebly bifid in the Maryland specimen), the apex of the pronotum slightly more strongly emarginate, more finely and sparsely punctate above, more sparsely punctate beneath, and in the usually smooth prosternum.

This rare species occurs from Maryland (Glen Echo in the U.S.N.M.) through North Carolina (Southern Pines, Nov. 23, in the U.S.N.M. and M.C.Z.: Fall coll.), "Ga." in the M.C.Z.: Fall coll., to Florida (Pensacola, Dec. 5, in the U.S.N.M. and Ormond in the A.M.N.H.).

14. Quadrifrons Blatchley

Quadrifrons Baltch., 1916, Can. Ent., **48**, 92.
Genotype: *Quadrifrons castaneus* Blatch.

Labrum small, its front edge broadly rounded, not emarginate. Front and clypeus projecting abruptly from head, subquadrate, its

sides parallel. Last joint of maxillary palpi oblong-cylindrical. Head without antennal grooves. Antennae reaching middle of thorax, first joint robust, obconical, second oval, one-length of third, which is slender and clavate; 4–8 short, as wide as long, closely united; club large, subglobose, 3-jointed, the sutures distinct, the two basal joints subequal, strongly transverse, the last joint obtusely conical, smaller but distinct. Eyes small, very prominent, coarsely granulated. Prosternal spine prolonged and convex between the coxae, then abruptly bent downward; mesosternum not carinate. Front tibiae with outer apical angle greatly prolonged in the form of a large triangular tooth, the outer sharp edge of the tibiae behind this projection curved and minutely serrate, the inner apical angle with a short spine. Middle and hind tibiae each armed at apex with two short, slender spines, their outer angles more or less produced, front tarsi feebly dilated, middle and hind ones slightly broadened; claws simple.

Related to *Perthalycra*, but the front more abrupt, labrum not bilobed, prosternum bent abruptly downward behind the front coxae and structure of front tibiae radically different.

Quadrifrons castaneus Blatchley

Quadrifrons castaneous Blatch., 1916, Can. Ent., **48**, 92–93.
Type: from Dunedin, Florida at Purdue University (Blatchley coll.) at Lafayette, Indiana.

Oblong-oval, convex. Above dark reddish or chestnut-brown, rather thickly clothed with slender, prostrate golden-yellow hairs, those along the margins of thorax, elytra and legs longer and erect, forming a fringe; antennae, legs, and under surface somewhat paler reddish-brown. Head nearly three times as wide as front, finely and sparsely granulate. Thorax convex, more than twice as wide as long, sides broadly rounded, apex feebly and broadly emarginate, base truncate, hind angles rounded; disc minutely alutaceous, finely and sparsely granulate-punctate, each puncture bearing a prostrate yellow hair. Scutellum very large, semi-oval, its apex broadly rounded. Elytra oblong, convex, scarcely as wide as the middle of thorax, one-third longer than wide, sides very feebly curved to apical fifth, then broadly rounded into the subtruncate apex, disc not striate, sculptured and pubescent like the thorax. Pygidium rather widely exposed, finely and sparsely granulate-punctate. Abdomen finely and rather closely punctate. Length 3.2 mm.

This rare species was collected on April 5 beneath a decaying woody fungus at Dunedin, Florida. Since it is unknown to the writer, the generic and specific description is copied from Blatchley.

15. Pocadius Erichson

Plates 8, 13

Pocadius Er., 1843, in Germar, Zeitschr. für Ent., **4**, 318.
Genotype: *Nitidula ferrugineus* Fabr.

Broadly oval, convex, sparsely pubescent. Head broad, clypeus moderately distinct. Antennae as long as the head, first segment large and convex, second moderately convex, as long as the third, third to fifth more slender, six to eighth strongly transverse, club large, oval, and compact. Antennal grooves deep and convergent. Labrum rather prominent, feebly bilobed. Mandibles with simple apex, an acute tooth behind the tip, feebly bearded. Lacinia rather short, rounded at tip, moderately heavily bearded. Maxillary palpi with first segment minute, second long and subclavate, third short, fourth as long as the second and third together. Ligula with laterally projecting paraglossae, palpi slender, first small, second subclavate, as long as the third. Mentum rectangular, feebly emarginate in front. Prothorax not as broad as the elytra. Elytra entire but exposing the pygidium; epipleurae broad and attaining the apices. Scutellum long. Prosternal process convex between the coxae; tip with conical protuberance. Mesosternum not carinate. Coxae all about equidistant. First and fifth ventral segments of equal length, each as long as second and third combined, second to fourth of equal length. Anterior tibiae slender, outer apical angle spiniform; middle and posterior tibiae finely spinulose externally. Tarsi all slender, claws simple. Male eighth dorsal segment visible from above.

This genus is not very closely related to any other in the Nearctic region, but it is near various old world genera, such as *Macroura*, *Pocadites*, and *Pocadiodes;* and so probably originated in Asia.

In addition to the four Nearctic species of *Pocadius*, there are known seven from Asia, two from Brazil, and one each from Argentina, Cuba, Europe, and Africa. The species are found in the puff-balls, *Lycoperdon* spp.

Key to Nearctic POCADIUS

1. Prosternum in profile strongly arcuate ..... *fulvipennis*
   Prosternum in profile moderately arcuate or nearly plane 2
2. Prosternum behind the coxae plane, not deflexed ..... *basalis*
   Prosternum behind the coxae more or less deflexed 3
3. Pronotum black with hind angles obtusely rounded ..... *niger*
   Pronotum testaceous to piceous, hind angles acutely rounded ....
   ..... *helvolus*

POCADIUS FULVIPENNIS Erichson

Plate 8, fig. 11

Pocadius fulvipennis Er., 1843, in Germar, Zeitschr. für Ent., **4**, 319.
Pocadius dorsalis Horn, 1879, Trans. Amer. Ent., **7**, 311.
Types: of *fulvipennis* from Mexico in the Berlin Museum; of *dorsalis* from California, a cotype no. 7966 in the M.C.Z. (Leconte coll.) and a cotype in the Philad. Acad. Nat. Sciences.

Oval, moderately convex, moderately shining, sparsely pubescent. The color varies from black with a red basal spot on each elytron to testaceous. Head coarsely, rather densely punctate. Prothorax twice as wide as long, narrowed in front, apex feebly emarginate, base arcuate at middle sinuate at sides, sides feebly arcuate, narrowly explanate, hind angles subrectangular, surface sparsely covered with coarse and fine punctures. Elytra conjointly with width to length as 1 to 1.1, sutural angles not dentiform, surface with ten rows of closely placed, but feebly impressed quadrate punctures, intervals flat with a single series of fine punctures. Length 2.5–4.2 mm.

This beetle is less oval, more depressed, and differently colored than *helvolus*. Its range is (April–June, March 17) Washington (Olympia, Seattle) to California (Marin Co., Trinity Co., Los Angeles Co.) and it is found in the puff-ball *Lycoperdon giganteum*.

POCADIUS BASALIS Schaeffer

Plate 8, fig. 8

Pocadius basalis Schaef., 1911, Journ. New York Ent. Soc., **19**, 117.
Type: from the Huachuca Mts., Arizona, August 29 in the U.S.N.M.; a paratype in the M.C.Z. (Liebeck coll.).

Broadly oval, moderately convex, moderately shining, sparsely pubescent. Color reddish-brown, apical two-thirds of elytra sometimes darker. Head coarsely, rather sparsely punctate. Prothorax

with width to length as 1.8 to 1, narrowed in front, apex feebly emarginate, base very feebly sinuate at sides, sides moderately arcuate, very narrowly explanate, hind angles subrectangular, surface sparsely covered with coarse and fine punctures. Elytra with width to length as 1 to 1.2, sutural angles feebly dentiform, surface with ten rows of rather closely placed, shallow, oval punctures, intervals flat with a single series of fine punctures. Length 3.8 mm.

The punctation of the pronotum is coarser than in *helvolus* and *fulvipennis;* the pronotal sides are more arcuate than in *fulvipennis;* but *basalis* is about as convex as the latter and less so than in the other species.

This rare species is known from the holotype and three paratypes from the type locality, and one without label in the U.S.N.M., a paratype from Palmerlee, Cochise Co., Arizona, Aug. 29 in the M.C.Z. (Liebeck coll.) and a specimen evidently collected with the types in the writer's collection (ex Leng coll.).

Pocadius niger Parsons

Plate 8, fig. 10

Pocadius niger, Pars., 1936, Psyche, **43**, 116–117.

Type: from Las Vegas Hot Springs, New Mexico, June 8 in the U.S.N.M.; paratypes in the M.C.Z. (general coll., Fall coll.) and in the writer's collection.

Broadly oval, convex, moderately shining, sparsely pubescent. Head and pronotum black, elsewhere dark piceous except for a somewhat triangular reddish brown spot on each elytron. Head coarsely, rather densely punctate. Prothorax with width to length as 1.8 to 1, narrowed in front, apex feebly emarginate, base very feebly sinuate, sides moderately and evenly arcuate, very narrowly explanate, hind angles obtusely rounded, surface sparsely covered with coarse and fine punctures. Elytra conjointly with width to length as 1 to 11, sutural angles feebly dentiform, each elytron with ten rows of oval, shallow punctures, intervals flat, irregularly biseriately punctulate. Length 3.2–4.3 mm.

The color and the irregular biseriate elytral punctation (also in *helvolus*) will at once distinguish this species. Also the hind angles of the pronotum are more obtuse than usual, and the pronotum is slightly more convex even than in *helvolus*.

The range is (June–August) New Mexico (Las Vegas Hot Springs) and Arizona (Pinal Mts., Sierra Ancha Mts.).

Pocadius helvolus Erichson

Plate 8, figs. 1–7, 9; pl. 13, fig. 15

Pocadius helvolus Er., 1843, in Germar, Zeitschr. für Ent., **4**, 320.
Pocadius breviusculus Reitter, 1876, Stettiner Ent. Zeit., **37**, 318.
Pocadius infuscatus Reitter, 1874, Verh. Nat. Ver. Brünn, **12**, 94.
Pocadius limbatus Reitter, 1874, Verh. Nat. Ver. Brünn, **12**, 95.
Types: of *helvolus* from eastern United States in the Berlin Museum; of *breviusculus* from North America in the Paris Museum; of *infuscatus* from North America presumably in the National Museum at Budapest (Reitter coll.); and of *limbatus* from North America presumably in the Mus für Naturkunde at Stettin.

Broadly oval, convex, moderately shining, sparsely pubescent. Color usually ferrugineous but varies from pale testaceous to dark ferrugineous with the elytra black except at median basal third. Prothorax with width to length as 1.9 to 1, narrowed in front, apex feebly emarginate, base sinuate on each side, sides feebly arcuate, very narrowly explanate, hind angles subrectangular, surface rather densely covered with coarse shallow punctures intermixed with fine punctures. Elytra conjointly with width to length as 1 to 1.1, sutural angles more or less feebly dentiform, each elytron with ten rows of vaguely impressed punctures, the intervals very slightly convex, irregularly biseriately punctulate. Length 3–4 mm.

This species varies considerably in convexity, punctation, and color. Horn, 1879, who saw Reitter's types, says that *breviusculus* is a small form found in the Gulf States, *infuscatus* merely a stained specimen, and *limbatus* a color variety. Some of the *limbatus* variety (with darkened elytra) tend to be less convex than usual. The writer, 1936, recorded *helvolus* from Cuba because *limbatus* and *infuscatus* are so listed by Grouvelle, 1913. Since then the writer has collected in Cuba a *Pocadius* which agrees with Reitter's description of *brevis*. The Cuban species varies as much as *helvolus* and may possibly be the same as *breviusculus*, but for the present it is best to exclude *helvolus* from Cuba.

This species occurs (June–September) from Connecticut (Stamford) and New York (West Point) to Georgia (Thomasville) west to eastern Texas (Columbus, Houston), Kansas, Nebraska, Montana, British Columbia, north to Manitoba (Aweme) and south into Mexico (Puente de Ixtla, Durango, Guanajuata).

16. Camptodes Erichson

Plates 8, 13

Camptodes Er., 1843, in Germar, Zeitschr. für Ent., **4**, 321–322.
Genotype: *Sphaeridium scutellatum* Sturm.

Broadly oval, convex, glabrous. Head broad, clypeus moderately distinct. Antennae longer than the head, first segment large and convex, second moderately convex about as long as the third, third to fifth slender about of equal length, sixth to eighth shorter and progressively thicker, club broadly oval. Antennal grooves deep, parallel. Labrum not prominent, bilobed. Mandibles with simple apex, a tooth behind the apex, moderately bearded. Lacinia rather short and slender, rounded at tip, heavily bearded. Maxillary palpi with first segment minute, second subclavate, third short, fourth slender and as long as the second and third combined. Ligula small and narrow, paraglossae laterally projecting, palpi with first segment small, second long and clavate, third as long as the second. Mentum transverse, bisinuately emarginate in front. Prothorax as broad as the elytra. Elytra entire, but exposing the tip of the pygidium. Epipleurae broad, barely attaining the apices. Scutellum large and broad. Prosternal process more or less flat, expended behind the coxae. Mesosternum carinate. Coxae all about equidistant. First ventral segment as long as the next three together, fifth one and one-half as long as the fourth. Anterior tibiae slender, outer apical angle simple. Tarsi broadly dilated, claws simple or toothed. Male eighth dorsal segment visible from behind.

Grouvelle places *Camptodes* between *Amphicrossus* and *Idaethina*. The latter is unknown to the writer, but the former is certainly more closely related to *Camptodes* than any other Nearctic genus.

Camptodes comprises about 160 tropical American species which occur on flowers. One is found in southern Arizona and three (one still unnamed) in extreme southeastern Texas.

1. Pygidium ferrugineous to piceous 2
   Pygidium testaceous to rufous . . . . . *texanus*
2. Color testaceous to dark rufo-piceous, humeri feebly pronounced . . . . . *gaumeri*
   Color jet black, humeri moderately pronounced . . . . . *nigerrimus*

Camptodes (Eucamptodes) texanus Schaeffer

Plate 13, fig. 7

Camptodes texanus Schaef., 1904, Journ. New York Ent. Soc., **12**, 203.
Type: described from two cotypes (no. 42,559) from Brownsville, Texas in the U.S.N.M.

Very broadly oval, rather strongly convex, shining, glabrous. Color dark fuscous to black, sometimes rufous or fading to rufous at the sides of the pronotum and apex of clypeus, elytra dark rufous to greenish black, rarely piceous, pygidium and beneath rufous, antennae unicolorous. Prothorax nearly twice as wide as long, narrowing in front, sides feebly arcuate, hind angles rectangular but obtuse, punctation sparse and very fine on disc, coarser at sides. Elytra very slightly broader than long, each elytron with nine very fine striae, intervals more coarsely and densely punctate than the pronotum, sutural striae distant from the suture but approaching the suture towards the apex, very close to the suture a fine row of punctures, apices feebly sinuate before the sutural angles. Beneath moderately coarsely punctate, pubescent. Claws dentate. Length 3.7–6 mm.

This species is near to the Mexican *morio* which is broader, has more finely punctate elytra, more distinct elytral humeri. It is even closer to *gaumeri*, which has the pronotum broader in front, is more obsoletely punctate, usually paler, and has a piceous pygidium.

This species occurs on Ebony (April–October) in Texas (Harlingen, Brownsville).

Camptodes (Eucamptodes) gaumeri Sharp

Camptodes gaumeri Sharp, 1890, Biol. Centr.-Amer. Col., **2** (pt 1), 330, pl. 10, fig. 21.
Type: from Temax in northern Yucatan in the British Museum and four paratypes in the U.S.N.M.

Similar to *texanus* but more obsoletely punctate above and beneath, pronotum in front slightly broader, antennal club slightly darker than the rest of the antenna, pronotum and scutellum usually rufous, sometimes dark rufous or rufo-piceous, elytra rufo-piceous, beneath testaceous or rufous, pygidium ferrugineous to piceous. Claws dentate. Length 4–5 mm.

An example from "Mex." (M.C.Z.) was compared with the type in the B.M. Later four paratypes were found in the U.S.N.M. All these agree with the specimens mentioned below.

This species occurs (April 20–June 25) at Brownsville, Texas (Cal.

Acad. Sci., M.C.Z.: Fall coll., and the writer's coll.), and in Mexico (Temax, Yucatan). One Texas specimen is testaceous beneath instead of rufous.

Camptodes (Eucamptodes) nigerrimus spec. nov.

Very broadly oval, rather strongly convex, shining, glabrous. Color above jet black, beneath black, legs and antennae piceous. One specimen differs in having the underside and pygidium ferrugineous. Mentum very sparsely punctate all over. Prothorax very nearly twice as wide as long, narrowing in front, sides evenly feebly arcuate, hind angles rectangular but obtuse, punctation sparse and very fine on disc, slightly more dense and, not at all or very slightly, coarser at sides. Elytra slightly broader than long, with about seven very fine striae (excepting the sutural), intervals more coarsely, densely, and irregularly punctate than the pronotum. Sutural striae distant from the suture but gradually approaching the suture towards the apex, close to the suture a row of very fine punctures, apices feebly sinuate before the sutural angles, humeral umbone rather prominent. Pygidium slightly deflexed apically, the deflexed part somewhat concave (not so in one specimen). An impunctate longitudinal line on scutellum. Claws dentate. Length 4.5–5.2 mm., width 3.2–3.6 mm.

This species is closely related to *morio* but differs in being less broad, less convex, clypeal suture usually more depressed, head more finely punctate, mentum more sparsely punctate, pronotal punctures not at all or only very slightly coarser and denser at the sides, elytra more coarsely punctate and striate, the humeral umbone nearer the lateral margin, and pygidium more finely punctate. Both *gaumeri* and *texanus* are more coarsely punctate, particularly on the head and the sides of the pronotum and elytra, pygidium more densely punctate, and they are differently colored; otherwise *gaumeri* and *texanus* are nearer to *nigerrimus* than is *morio*. The humeral umbone is more pronounced and slightly nearer the lateral margin than in either *texanus* or *gaumeri*.

Holotype (♀) and paratypes from Patagonia, Santa Cruz Co., Arizona, July 6, 1936, M. Cazier collector. Holotype and paratype are in the L. Gillogly collection; paratypes are in the A.M.N.H. (Cazier coll.) and the writer's collection. One specimen differs from the others in having a rufous underside and pygidium, the pygidium undeflexed, not concave at apex, and is more obsoletely punctate.

17. Amphicrossus Erichson

Plates 8, figs. 20–26; pl. 13, fig. 6

Amphicrossus Er., 1843, in Germar, Zeitschr. für Ent., **4**, 346.
Genotype: *Nitidula ciliatus* Oliv.

Lobostoma Fairm., 1892, Rev. d'Ent., **11**, 90.
Genotype: *Lobostoma picea* Fairm.

Rhacostoma Berg, 1898, Com. Mus. Nat. Buenos Aires, **1**, 18. pro *Lobostoma* Fairm. nec Gundlach, 1840.

Oval, convex, pubescent. Head moderate, clypeus indistinct. Antennae longer than the head, first segment enlarged, second convex, third slightly shorter than the second, third to fifth slender, sixth to eighth short and progressively transverse, club oval, moderately compact. Antennal grooves subocular, slightly convergent. Labrum bilobed. Mandibles bidentate at tip, the inner tooth shorter than the outer, feebly bearded. Lacinia short, rounded at tip, and heavily bearded. Maxillary palpi with first segment small, second subclavate, third short, fourth as long as the second and truncate. Ligula moderate; palpi with first segment small, second subclavate as long as the third, which is truncate at tip. Paraglossae large. Mentum transverse. Prothorax about as broad as the elytra, its hind margin overlapping the base of the elytra. Elytra entire, exposing the tip of the pygidium; epipleurae broad, attaining the apices. Prosternum more or less carinate, the process prolonged and slightly expanded behind the coxae. Mesosternum carinate. First ventral segment as long as the next two combined; the fifth slightly longer than the fourth. Anterior tibiae simple, middle and posterior spinulose externally. Anterior tarsi broadly dilated, middle moderately dilated, posterior very feebly dilated. Claws simple. Male eighth dorsal segment visible only from beneath; in some species the males have a pencil of setae on each elytron at or near the suture at its middle.

Amphicrossus seems to be, as Grouvelle placed it, intermediate between *Camptodes* and *Cychramus*.

This cosmopolitan genus contains about thirty species. *Amphicrossus* is absent from Europe, its center of distribution lying in eastern Asia. Therefore the few (5) rare American forms probably have developed from ancestors which immigrated from Asia. Apparently all the species feed at sap.

Key to Nearctic species

Elytral margins broadly fimbriate, prosternum obtusely carinate . . . . . *ciliatus*

Elytral margins narrowly fimbriate, prosternum acutely carinate . . . . . *niger*

Amphicrossus ciliatus (Oliv.)

Nitidula ciliatus Oliv., 1811, Encycl. meth., **5**, 210.

Nitidula unilineatus Say, 1825, Journ. Acad. N. S. Philad., **5**, 182.

Types: of *ciliatus* "sur les ulcéres du *Liquidambar* en Caroline" probably in the Paris Museum; of *unilineatus* from eastern United States is lost.

Broadly oval, convex, sparsely pubescent. Color testaceous to dark rufo-piceous, legs paler. Pronotum paler at sides and with a median basal pale spot. Each elytron with five pale spots. These pale markings may be absent in the dark specimens. Head densely punctate. Prothorax slightly less than twice as wide as long, narrowed in front, apex deeply emarginate, lateral margins feebly arcuate, moderately fimbriate, hind angles broadly rounded, base truncate, surface moderately coarsely and densely punctate. Elytra conjointly as wide as long, margins broadly fimbriate, surface more finely and sparsely punctate than the pronotum. The males have a pencil of setae on each elytron near the sutural margin at middle. Length 3.5–4.5 mm.

For comparisons with *niger* see under the latter species.

This species occurs (April–Sept. in the north, throughout the year in the south) from Ontario to Florida (Key Largo, Lake Mary, Enterprise), Cuba (Cayamas), Panama (Old Panama), west to Texas (Dallas), Missouri, and Iowa. In the spring *ciliatus* is found at sap, but in the autumn occurs on flowers of *Eupatorium* and allied plants.

Amphicrossus niger Horn

Amphicrossus niger Horn, 1879, Trans. Amer. Ent. Soc., **7**, 317.

Type: from Arizona, three cotypes in the Philadelphia Acad. Nat. Sci. and one in the M.C.Z. (Leconte coll.).

Oval, convex, sparsely pubescent. Unicolorous, fuscous above, somewhat paler beneath. Head rather sparsely punctate. Prothorax nearly twice as wide as long, narrowed in front, apex deeply emarginate, lateral margins feebly arcuate, narrowly fimbriate, hind angles obtusely rounded, surface moderately finely and sparsely punctate.

Elytra conjointly longer than wide, margins narrowly fimbriate, surface more finely and sparsely punctate than the pronotum; no elytral pencils of setae in the males. Prosternum acutely carinate.

Aside from the key characters, *niger* differs from *ciliatus* in being fuscous, unicolorous, lacking the pencil of setae on each elytron, more parallel, the pronotum more emarginate in front, and more finely punctate.

This species is known from southern Arizona (San Pedro River, Fairbanks, Sept. 6; Tucson, July 19, Aug. 16; Baboquivari Mts.).

18. Cychramus Kugelann

Plates 9, figs. 1–7; pl. 13, fig. 9

Cychramus Kug., 1794, in Schneid. Mag., **5**, 543.
Genotype: *Sphaeridium luteum* Fabr.
Campta Stephens, 1830, Illust. Brit. Ent., **3**, 30, 44.
Genotype: *Sphaeridium luteum* Fabr.

Oval, convex, pubescent. Head moderate, clypeus moderately distinct. Antennae about as long as the head, first segment strongly widened anteriorly, second convex, shorter than the third, fourth to eighth progressively more transverse, club broadly oval, compact. Antennal grooves short and convergent. Labrum feebly emarginate. Lacinia broad and rounded at tip, with rather short beard; palpi with first segment small, second short, slightly longer than the third, fourth as long as the second and third together. Mandibles broad, bidentate at tip, feebly bearded. Ligula large, paraglossae moderate, palpi thick, first segment small, second clavate, third longer than the second, thickened and truncate at tip. Mentum emarginate in front. Pronotum about as wide as the elytra, hind margin extending over base of elytra. Scutellum rounded posteriorly. Elytra entire, exposing the tip of the abdomen. Epipleurae broad, attaining the apices. Prosternal process acutely elevated behind the coxae. Mesosternum vertical, not carinate. First ventral segment longer than the next two combined, second to fourth of equal length, fifth as long as third and fourth combined. Tibiae simple, tarsi broadly dilated, claws simple. Male eighth dorsal segment small, visible only from beneath.

Cychramus resembles *Amphicrossus* but on dissection turns out to be most nearly related to *Cyllodes*.

This genus contains 16 species found generally except in the Ethiopian region. Two occur in the United States in fungi and at flowers.

Cychramus adustus Erichson

Cychramus adustus Er., 1843, in Germar, Zeitschr. für Ent., **4**, 346.
Type: from eastern United States in the Berlin Museum.

Broadly oval, convex, pubescent. Color ferruginous, with lateral margins and posterior halves of elytra piceous, but the elytra may be entirely ferrugineous or entirely dark piceous. Head slightly less densely punctate than the pronotum. Prothorax with width to length as 1.7 to 1, strongly emarginate in front, sides feebly arcuate, finely fimbriate, hind angles obtusely subrectangular, base truncate, surface densely and moderately coarsely punctate. Elytra conjointly as long as broad, slightly narrower posteriorly, margin finely fimbriate, apex obtusely truncate, surface with fine elongate punctures arranged in regular series. Tibiae simple. Length 3–4.5 mm.

This species is near to and probably derived from the European *luteus*.

This species occurs (May–Sept., chiefly in June) from New Hampshire to Georgia, west through Alabama (Metanka, Langdale) to Texas (Dallas), Missouri, and Michigan (Detroit).

Cychramus zimmermanni Horn

Cychramus zimmermanni Horn, 1879, Trans. Amer. Ent. Soc., **7**, 319.
Type: from South Carolina, no. 7969, in the M.C.Z. (Leconte coll.).

Oval, strongly convex, sparsely pubescent. Dark ferrugineous, elytra somewhat darker to piceous. Head punctate as in the pronotum. Prothorax with width to length as 1.7 to 1, narrower in front, sides feebly arcuate, finely fimbriate, hind angles obtusely subrectangular, base truncate, surface densely, moderately coarsely, submuricately punctate. Elytra conjointly slightly wider than long, margins finely fimbriate, seriately, finely, submuricately punctate. Anterior tibiae feebly sinuate on the outer side, the apical angle produced into a long, triangular tooth; middle tibiae sinuate externally, the apical angle moderately prolonged; posterior tibiae feebly sinuate, the apical angle more prolonged than the middle but distinctly less than in the anterior tibiae. Length 3.7–4.2 mm.

This species is less oval and more convex than *adustus* and differs in the tibiae and punctation.

In addition to the type there is a specimen from Georgia in the M.C.Z. (F. C. Bowditch coll.).

19. Pallodes Erichson

Pallodes Er., 1843, in Germar, Zeitschr. für Ent., **4**, 348–350.
Genotype: *Pallodes silaceus* Er. = *pallidus* Beauvois.

Medium size, oval, moderately strongly convex, glabrous. Head moderate, clypeus moderately distinct. Antennae longer than the head, first segment enlarged, second convex, third to seventh slender becoming progressively convex, eighth transverse, club large, oval, and compact. Antennal grooves short and convergent. Labrum feebly emarginate. Mandibles strongly bidentate at tip. Lacinia rounded at tip, moderately bearded; palpi with first segment small, second rather short and clavate, third shorter than the second, fourth rather thick, as long as the second and third. Ligula large, paraglossae moderate, labial palpi thick, first segment small, second short and clavate, third oval, and truncate at tip. Mentum rectangular, feebly emarginate in front. Pronotum narrower than the elytra. Elytra entire, exposing the tip of the pygidium; epipleurae narrowing rapidly, barely attaining the apices. Scutellum large, triangular. Prosternal process moderately expanded behind the coxae. Mesosternum carinate (carina may be absent in some individuals). First ventral segment as long as the fifth which is less than twice as long as the fourth, second to fourth of equal length. Outer apical angles of the tibiae are obtusely rounded. Anterior and middle tarsi moderately broadly dilated, posterior tarsi slender and greatly lengthened, being as long as tibiae. Male eighth dorsal segment only slightly exposed, visible only from beneath.

Grouvelle, 1913, has made the Japanese *Neopallodes* a synonym of *Pallodes*, but the former is certainly a valid genus.

Pallodes contains about 80 species which are distributed generally except in continental Eurasia and Australia. The two Nearctic species are evidently immigrants from the very rich Neotropical *Pallodes* fauna.

Pallodes pallidus (Beauvois)

Plates 9, figs. 8–16; pl. 13, fig. 8

Sphaeridium pallidum Beauv., 1805, Ins. rec. en Afr. et en Amer., p. 157, pl. 6, fig. 1.

Pallodes silaceus Er., 1843, in Germar, Zeitschr. für Ent., **4**, 350.

Grouvelle's listing, 1913, of "*unistriatus* Horn (non Palisot)" as a synonym is due to a misunderstanding of Horn, 1885, Ent. Amer., **1**, 90.

Types: of *pallidus* from South Carolina is unknown to the writer; of *silaceus* from eastern United States is in the Berlin Museum.

Oval, rather strongly convex, glabrous, shining, elytra iridescent. Color varying from testaceous to dark rufous with elytra black. Pro-

thorax more than twice as wide as long, apex rather strongly emarginate, sides arcuate, narrowed in front, hind angles subrectangular, base feebly arcuate, at middle a very short, truncate scutellar lobe, surface very finely and sparsely punctate. Elytra conjointly longer than wide, each elytron with nine rows of moderate punctures, the sutural row deeply impressed; intervals with a single series of very fine punctures. Length 3—4 mm.

This species occurs (May-Sept.) from Massachusetts (Marthas Vineyard) to Florida (Lake Mary, Lake Co., Crescent City, Jacksonville) west to Texas, Arkansas (Hope), north to Michigan (Galesburg). It is found in fleshy fungi, such as *Tricholoma terrifera, Lactarius volemus,* and *Collybia platyphylla.*

Pallodes plateosus Schaeffer

Pallodes plateosus Schaef., 1931, Bull. Brooklyn Ent. Soc., **26**, 174–5.
Type: from Huachuca Mts., Arizona in the U.S.N.M.

Similar to *pallidus.* Head and antennal club rufo-piceous. Pronotum testaceous with a large blackish central spot and on each side of this a small round black spot. Scutellum and elytra dark rufous, the elytra blackish laterally and apically. Beneath dark rufous. Punctation more obsolete, and the anterior and middle tibiae more slender than in *pallidus.* As in *pallidus* the punctation varies in distinctness. Length 3.6—4.3 mm.

Of the species in the British Museum, *sellatus,* described by Sharp from Mexico, is closely related to *plateosus.*

This species occurs in southern Arizona at Palmerlee and in Ramsey Canyon, Huachuca Mts., where it was collected in quantity on August 3.

20. Cyllodes Erichson

(Plates 9, figs. 17–25; pl. 13, fig. 10)

Cyllodes Er., 1843, in Germar, Zeitschr. für Ent., **4**, 342.
Genotype: *Strongylus ater* Herbst.
Stronglus Herbst (*pars nec* Muller, 1780), 1792, Natursyst. Ins. Käf., **4**, 179.
Volroxis Kugel., 1794, in Schneid. Mag., **1**, 355 (pars).
Pseudocamptodes Grouvelle, 1896, Ann. Soc. Ent. Fr., **65**, 76.

Medium size, oval, moderately strongly convex, glabrous. Head moderate, clypeus moderately distinct. Antennae longer than the head, first segment enlarged and convex, second convex, third to fifth

slender, sixth and seventh short and convex, eighth transverse, club large and elongate oval. Antennal grooves short and convergent. Labrum feebly emarginate. Mandibles broad, simple at tip, with about two small teeth behind the tip, feebly bearded. Lacinia very broad and feebly bearded; first segment of palpi minute, second short and clavate, slightly longer than the third, fourth as long as first three together. Ligula large, paraglossae moderate, labial palpi thick, first segment small, second clavate, third oblong, about as long as first and second. Mentum rectangular, feebly emarginate in front. Pronotum slightly lobed at base, narrower than the elytra. Elytra entire, exposing the tip of the pygidium; epipleurae broad and attaining the apices. Scutellum large, somewhat rounded posteriorly. Prosternal process somewhat expanded behind the coxae and abruptly vertical. Mesosternum carinate, usually concealed by the meeting of the pro- and metasternum, the latter prominent in front. First ventral segment twice as long as the second, longer than the fifth, second to fourth of equal length. Outer apical angle of the tibiae acute but not spiniform. Anterior and middle tarsi rather broadly dilated, posterior tarsi feebly dilated; claws simple. Male eighth dorsal segment only slightly visible from behind.

This genus is closely related to both *Pallodes* and *Oxycnemus*, particularly the latter. *Cyllodes* is cosmopolitan and contains over 60 species.

Cyllodes biplagiatus Leconte

Cyllodes biplagiatus Lec., 1866, Proc. Acad. Nat. Sci. Philadelphia, p. 377. Type: from Massachusetts, no. 6983, in the M.C.Z. (Leconte coll.).

Broadly oval, rather strongly convex, glabrous, shining. Color black, a large, nearly round, red spot near the base of each elytron. Head rather finely and densely punctate. Prothorax slightly less than twice as wide as long, narrowed in front, apex strongly emarginate, sides moderately, evenly arcuate, hind angles subrectangular, base with a short, broad, scutellar lobe. Elytra conjointly as wide as long, each elytron with seven rows of rather fine punctures, each interval with an irregular row of very fine punctures. Prosternum coarsely, densely punctate. Tarsi piceous. Length 3.5—4.5 mm.

This species occurs (May-July) from New Hampshire (Three Mile Isl.) to New Jersey (Orange Mt., Monmouth Jct.), west through New York (Buffalo), Michigan (Detroit, Marquette), Wisconsin (Bayfield), Minnesota (Filmore Co.), to Manitoba (Aweme, Winnipeg, Victoria

Beach). Perhaps significantly it is not recorded from Indiana by Blatchley.

Wickham, 1894, Ent. News, 5: 262, pl. 8, describes the biology of *biplagiatus*. The larvae and adults live only in the Oyster fungus, *Pleurotus ostreatus*, and pupation is in the earth.

21. Oxycnemus Erichson

Plates 10, 13

Oxycnemus Er., 1843, in Germar, Zeitschr. für Ent., **4**, 351.
Genotype: *Oxycnemus fulvus* Er.
Psilopyga Leconte, 1853, Proc. Acad. N. S. Philad., **6**, 286.
Genotype: *Psilopyga histrina* Lec.
Eugoniopus Reitter, 1884, Wien. Ent. Zeit., **3**, 264, 267.
Genotype: *Eugoniopus lewisi* Reitter.

Medium size, oval, convex, glabrous. Head short, clypeus moderately distinct. Antennae longer than the head, first segment enlarged, second convex and slightly longer than the third, third to seventh slender and becoming progressively convex, eighth strongly convex, club large, oval, and compact. Antennal grooves long and parallel. Labrum strongly bilobed. Mandibles with a simple apex, a small or large tooth more or less near the apex, feebly bearded. Lacinia very short and broad, moderately bearded; maxillary palpi thick, first segment minute, second and third of equal length, fourth rounded at tip, as long as the second and third combined. Ligula broad, paraglossae moderate, first segment of palpi small, second strongly clavate, third egg-shaped. Mentum feebly emarginate in front. Pronotum about as broad as the elytra, hind margin at middle usually with a short but broad, squarely truncate lobe. Scutellum large, triangular. Elytra truncate, exposing most of the pygidium; epipleurae broad and sinuate on the inner margin, attaining the apices. Prosternal process broadly expanded behind the coxae, covering the mesosternum. Mesosternum may or may not be carinate within a single species. Second and third ventral segments combined shorter than the first but longer than the fifth, two to four about equal in length. Tibiae with outer apical angle dentiform; anterior tarsi broadly dilated, middle slightly less broadly dilated, and posterior tarsi longer and distinctly more feebly dilated; claws simple. Male eighth dorsal segment easily visible from behind.

Of the Nearctic genera *Oxycnemus* is nearest to *Cyllodes*. Sharp, 1891, and Reitter (loc. cit.) have separated genera based on variations

in the mesosternum. Since this character varies individually, other differences will have to be found before *Psilopyga* can be validated.

Oxycnemus contains 12 species distributed throughout the New World and in eastern Asia. The Nearctic species live in stinkhorn fungi (*Phallus* sp.).

Key to Nearctic Oxycnemus

1. Elytra unicolorous 2
   Elytra bicolorous ..... *fasciata*
2. Pronotum and pygidium black or piceous ..... *histrina*
   Pronotum and pygidium bright rufous ..... *nigripennis*

Oxycnemus fasciatus (Sharp)

Psilopyga fasciata Sharp, 1891, Biol. Centr.-Amer., Coleop., **2** (**1**), 364.
Type: from Mexico in the British Museum.

Oval, convex, shining. Dark brown, elytra black except for an orange basal one-third to three-fifths. Head densely, moderately coarsely punctate. Prothorax as wide as long, surface densely, finely punctate. Each elytron with nine or more less complete rows of rather fine punctures, intervals sparsely, finely punctate. Length 5.2—5.5 mm.

This species has a narrower and more carinate prosternal process than *histrina* and differs in color and punctation.

A specimen from Prescott, Arizona (U.S.N.M.) was compared with the unique type by the writer.

Oxycnemus histrina (Leconte)

Plates 10, figs. 1–8; pl. 13, fig. 12

Psilopyga histrina Lec., 1853, Proc. Acad. N. S. Philadelphia, p. 287.
Type: from Pennsylvania, no. 6981, in the M.C.Z. (Leconte coll.).

Broadly oval, convex, shining. Usually black, sometimes dark brown. Head very coarsely punctate, with fine punctures intermixed. Prothorax slightly wider than long, surface rather finely punctate, intermixed with extremely fine punctures, some coarse punctures near the apex. Each elytron with ten rows of coarse punctures, intervals slightly convex, very finely punctate. Length 4—6.5 mm. (typical form).

Variation A. Length 6.6—7.7 mm. Yellow with black elytra, and a black, rectangular, basal, pronotal spot; much larger than typical *histrina*, which is 4—6.5 mm. long. This form is represented by one in the M.C.Z. (Fall coll. ex Liebeck coll.) without label and two from

Monterey, Mass. (U.S.N.M.) collected in the same *Phallus* with typical *histrina*.

Variation B. Length 5.4—6.5 mm. Sculptured like *histrina*, but colored like typical *nigripennis*, except for a large, semicircular, black, basal, pronotal spot. This form is represented by two from Rockhaven, Kentucky, one from Canton, North Carolina (U.S.N.M.), and one from Yaphank, N. Y. (Fall coll.).

This species occurs (June-Nov., chiefly in August) in the stinkhorn fungus (*Phallus impudicus*) from New Hampshire to North Carolina (Asheville, Rocky Bottom, Table Rock) and Kentucky (Rockhaven), west through Indiana to Wisconsin (Baraboo).

Oxycnemus nigripennis (Leconte)

Psilopyga nigripennis Lec., 1863, Smithson. Misc. Coll. **6**, 64.
Type: from Pennsylvania, no. 6982, in the M.C.Z. (Leconte coll.).

Similar to *histrina* but differing as follows. Bright rufous, elytra black. Head moderately coarsely punctate, not intermixed with fine punctures. Pronotum moderately punctate, without the very fine punctures or the coarse punctures near the apex. Prosternum more carinate; the prosternal process narrower between the coxae and more rounded posteriorly. Elytral intervals are more coarsely punctate. The outer apical angles of the tibiae are more prolonged. Length 3.3—4.5 mm.

Very rarely this species has been collected in the same stinkhorn fungus with *histrina*, but in these cases no intergrading forms have been found.

This species occurs (March 9, July-Sept.) in the stinkhorn fungus *Phallus impudicus*) from Massachusetts (Tyngsboro) through New York (Yaphank), Maryland (Glen Echo), Virginia (Scott's Run, Fredericksburg), to North Carolina (Table Rock) and Kentucky (Rockhaven), west to "Indiana" (Blatchley).

MELIGETHINAE

Meligethina Thoms., 1859, Skand. Coleop., **1**, 67.

This subfamily contains nine genera of which only one is Nearctic. The Meligethinae have been placed between the Cateretinae and Carpophilinae by Grouvelle (1913) and Leng (1920), between the Carpophilinae and the Nitidulinae by Reitter (1911), and in the Nitidu-

linae by Horn (1879) and Ganglbauer (1899). Since the Carpophilinae and the Nitidulinae intergrade, the Meligethinae will have to be placed after the Nitidulinae, particularly as *Meligethes* is more derivative than many genera in the latter subfamily.

Meligethes Stephens

Plates 10, 13

Meligethes Stephens, 1830, Ill. British Ent., Mandibulata, **3**, 30, 45 (pars).
Genotype: *Nitidula rufipes* Marsh. = *Meligethes atratus* (Oliv.).

Head narrower than pronotum, no line or furrow separating the clypeus from the front. Third antennal segment narrow, about as long as the first; the compact three-segmented club is oval or round. Antennal grooves deep and nearly parallel. Labrum transverse, bilobed, often entirely concealed by the clypeus. Mandibles short and broad, apex simple with one or two blunt teeth on the inner margin. Lacinia slender, its apex bent inwards at right angles; galea absent. Maxillary palpi rather short and thick; first segment minute, second and third short and thick, about of equal length, the fourth more slender and about as long as the second and third combined. Mentum strongly transverse, the anterior margin strongly emarginate. Second segment of the labial palpi about twice as long as the first, the third about as long as the first two combined. Pronotum about as broad as the elytra at their base; hind angles acutely rounded. Scutellum triangular. Elytra more or less covering the pygidium; epipleurae broad, nearly attaining the apices. Prosternal process expanded posteriorly, overlapping the mesosternum. Mesosternal process truncate, about as wide as the prosternal process. First ventral segment at middle about as long as the fifth, or the second and third combined; fourth as long as the third. Last ventral segment with a deeply impressed, semicircular line on each side, usually in great part concealed by the retraction of the segment. Anterior tibiae usually more or less serrate; sometimes finely denticulate; tarsi broadly dilated; claws usually simple, rarely dentate (subg. *Acanthogethes* and *Odontogethes*).

Grouvelle places this genus among exotic genera which are unknown to the writer. *Meligethes* contains about 240 species, distributed generally except in the Neotropical region. Evidently the Nearctic species are derived from Siberia.

In Europe the larvae are known to feed on the pollen of various flowers and pupate in the earth. The adults also feed on pollen, and

some species seem to be restricted to a single kind of plant. For a résumé of the biology up to 1899 see Ganglbauer (1899) 3: 494. Additional references for *Meligethes aeneus* are Chittenden, 1925, Bull. Brooklyn Ent. Soc., 20: 149; Burkhardt and Lengerken (1920) Zs. angew. Ent., 6: 270-295; Aksenov (1929) Bull. Siberian Prot. Plants Sta., Tomsk, 6: 559-562.

The Nearctic species of *Meligethes* are extremely plastic and apparently are in the process of differentiating, as they already have in Europe, into a number of forms. Intergradations are so numerous, particularly with *mutatus* and *aeneus*, that crossing probably occurs.

Key to subgenera (Nearctic)

Claws dentate, upper side without metallic lustre . . . . . *Acanthogethes*
Claws not dentate, often with metallic lustre . . . . . *Meligethes* s. str.

Subg. Acanthogethes Reitter

Acanthogethes Reitt., 1871, Verh. nat. Ver. Brünn, **9**, 49.
Subgenotype: *Meligethes solidus* Kug.

Meligethes pinguis Horn

Plate 10, fig. 18

Meligethes pinguis Horn, 1879, Trans. Amer. Ent. Soc., **7**, 314–315.
Type: Côte sud, Terre Neuve, no. 7967 in the M.C.Z. (Leconte coll.). Horn states that L. Reiche gave the specimen to Leconte.

Broadly oval, robust, piceous, feebly shining, sparsely pubescent, surface moderately densely punctate, the elytra more densely than the pronotum. Prothorax nearly twice as wide as long, narrower in front, sides arcuate, more broadly arcuate anteriorly, hind angles obtuse, margin narrow not deplanate, disc convex. Elytra convex, as broad as long. Body beneath coarsely punctate, piceous, legs paler. Anterior tibiae coarsely serrate, middle and posterior tibiae finely denticulate. Prosternum slightly broader behind the coxae, rounded at tip. Clypeus rather deeply emarginate, the lateral angles acute. Length 2.5 mm.

This species is based on the unique specimen from the south coast of Newfoundland. Until it is rediscovered, it must remain a doubtful member of our fauna. It may well be introduced, since it falls well within the range of variation of the Palaearctic *fuscus* Oliv. as shown by the series in the writer's collection.

Subg. Meligethes s. str.

Key to Nearctic species

1. Anterior tibiae more or less finely denticulate.....2
   Anterior tibiae strongly serrate.....*saevus*
2. Pronotal margins distinctly explanate.....3
   Pronotum very narrowly margined, the margin not explanate.....
   .....*seminulum*
3. Explanate margin of prothorax extending from base to apex..*aeneus*
   Explanate margin of prothorax not attaining the base....*mutatus*

Meligethes saevus Leconte

Plate 10, fig. 19

Meligethes saevus Lec., 1859. Smithson. Contrib. Knowl., **11**, 6.
Type: from the Platte River, Nebraska, no. 6974 in the M.C.Z. (Leconte coll.).

Oval, black, shining, very sparsely pubescent. Clypeus feebly emarginate. Head and pronotum densely punctate, not alutaceous. Antennae dark piceous. Prothorax with width to length as 1.7 to 1, narrowed in front, sides moderately arcuate, margin narrow, hind angles obtuse, disc convex. Elytra conjointly very nearly as wide as long, surface a little more sparsely and coarsely punctate than the pronotum. Scutellum transversely alutaceous. Beneath black, coarsely and rather sparsely punctate. The curved lines each occupy about one-third the total width of the last ventral segment. Anterior tibiae strongly serrate, middle tibiae finely spinulose, posterior tibiae dilated and finely spinulose. Length 2—2.7 mm.

The emargination of the middle tibiae, mentioned by Horn, is merely an imperfection found only in the type, because the opposite tibia of the same specimen is normal.

This species occurs (April-August) from Illinois and Tennessee (Madison) west to Missouri, Kansas (Topeka), Nebraska (Platte River), Minnesota, North Dakota (Devil's Lake), and Montana; also New Mexico (Beulah) and Colorado.

Meligethes seminulum Leconte

Plate 10, fig. 22

Meligethes seminulum Lec., 1857, Rept. of Expl. and Surv. Miss. to Pacific, **12**, 37.
Type: from Oregon, no. 6978, in the M.C.Z. (Leconte coll.).

Oval, slightly oblong, shining black, sparsely pubescent. Head densely punctate; clypeus nearly squarely truncate. Prothorax twice as wide as long, narrower in front, sides more arcuate anteriorly than posteriorly, margin very narrow, not deplanate, hind angles obtusely rectangular, surface rather densely punctate. Scutellum alutaceous. Elytra conjointly one-fourth longer than wide, slightly narrowed to apex, surface more sparsely and feebly punctate than the pronotum. Beneath rather densely punctate. Anterior tibiae variably denticulate (see figures), middle and posterior tibiae finely spinulose. Length 1.9 mm.

This species is variable, but extremes of variation are found at the same place. Therefore, until ecological or more exact geographical differences can be ascertained, all the specimens must be included under one name. As the species now stands, the type is "atypical."

The range of this species seems to be discontinuous. It occurs (April–July) in Massachusetts (Wayland, Sherborn), Pennsylvania (Lester, Norwood, Chestnut Hill, Reading, Easton, Mt. Neversink), north shore of Lake Superior, Manitoba (Mile 214, Hudson Bay R.R.), Alberta (Edmonton, on *Mertensia paniculata*), Oregon (Hood River), and Yukon (Dawson).

Meligethes aeneus (Fabricius)

Plate 10, figs. 20, 21

Nitidula aeneus Fabr., 1775, Ent. Syst., p. 78.
Meligethes brassicae Reitt. (non Scopoli), 1875, Europ. Nitid., p. 16.
Meligethes moerens Lec., 1857, Pacific R.R. Reports, App. 1, p. 37.
Meligethes rufimanus Lec., 1857, Pacific R.R. Reports, App. 1, p. 37.
Meligethes californicus Reitt., 1871, Rev. Europ. *Meligethes*, Brunn, p. 33. 1873, Verh. nat. Ver. Brunn., **12**, 62.
Types: of *aeneus* from England (Banks collector) presumably in the British Museum (J. Banks coll.); of *brassicae* from Europe and *californicus* from California both presumably in the Hungarian Nat. Mus. in Budapest (Reitter coll.); of *moerens*, no. 6977 from Oregon, and *rufimanus*, no 6975 from San Jose, Calif. on flowers of *Ranunculus*, both in the M.C.Z. (Leconte Coll.).
For complete synonymy see Grouvelle, 1913.

Oval, slightly oblong, black, brownish, or greenish, with an aeneous tinge. Clypeus nearly truncate. Prothorax with width to length as 1.8 to 1, narrower in front, hind angles obtusely rectangular, sides from base to apex narrowly explanate, surface rather densely punctate.

Elytra conjointly one-fourth longer than wide, slightly narrowed to apex, apices separately rounded, surface more shining, more sparsely and finely punctate than the pronotum. Body beneath black, antennae and legs piceous or black. Anterior tibiae more or less finely denticulate (see figures), middle and posterior tibiae dilated, finely spinulose. Length 1.9–2.5 mm.

This extremely variable species grades into *mutatus;* in fact the variation of the Palaearctic specimens of *aeneus* in the writer's collection is great enough to include *mutatus.*

This species occurs all over the Palaearctic region except southeastern Asia, and in North America (March 4, May–July), particularly on the flowers of *Ranunculus* and *Salix* from British Columbia (Cawston) and Montana (Bozeman) to southern California (San Bernadino Mts.), Arizona (Gila River), and New Mexico (Santa Fe); also specimens that are more or less typical have been seen from Tennessee, Indiana, Pennsylvania, and Maine.

Meligethes mutatus Harold

Plates 10, figs. 9–17, 23; pl. 13, fig. 3

Meligethes ruficornis Lec., 1859, Smiths. Contr. Knowl., **11**, 6 (non *ruficornis* Heer).

Meligethes mutatus Harold, 1868, Cat. Coleopt., **3**, 827.

Type: from the Platte River, Nebraska, no. 6976 in the M.C.Z. (Leconte coll.).

This species is so closely related to *aeneus* that only the slight differences are detailed. Both species are so variable that these differences are not to be strictly interpreted. In *mutatus* the form is slightly more robust, the pronotal sides less arcuate, the surface subopaque, and the interspaces between the punctures distinctly alutaceous. The margins of the prothorax deplanate, usually not attaining the hind angles. At about the posterior fourth of the prothoracic margins, the latter become broader, forming a vague depression (varying in distinctness) behind which the margin is not distinctly explanate. The elytral apices tend to be more truncate, the posterior sutural angles less rounded, and the punctuation of the upper surface of the pronotum closer and finer than specimens of *aeneus* from Tennessee, Pennsylvania, and Horn's specimen from "Cal." which he labelled *rufimanus* (= *aeneus*). Length 2–2.5 mm.

This species occurs (May–July, March) from New York to California, particularly in the cordilleran region from Montana to Arizona and New Mexico.

CRYPTARCHINAE

Ipinae Er., 1843, in Germar, Zeitschr. für Ent., **4**, 355.

This subfamily, apparently the most derivative, contains eight genera of which three occur in the Nearctic region. Its distinguishing character is that the labrum is connate with the clypeus, the suture more or less distinct.

Key to Nearctic genera

1. Anterior coxal cavities open behind 2
   Anterior coxal cavities closed behind; thorax not margined at base, body glabrous . . . . . *Pityophagus*
2. Thorax margined at base, slightly overlapping the base of the elytra; body usually pubescent . . . . . *Cryptarcha*
   Thorax not margined at base; body glabrous . . . . . *Glischrochilus*

PITYOPHAGUS Shuckard

Plates 11, 13

Pityophagus Shuck., 1839, Elem. Brit. Ent., pp. 171–2.
Genotype: *Dermestes ferrugineus* Linn.

Elongate, subcylindrical, glabrous. Head large, eyes small, clypeus not at all evident. Antennae as long or slightly shorter than the head, first segment enlarged, second slightly more convex than the third, fourth to eighth moniliform, club oval and compact. Antennal grooves long, deep, and strongly convergent. Labrum small, not emarginate. Mandibles variable, simple or very strongly and bluntly bifid at tip, well bearded. Lacinia long, rounded at tip, feebly bearded; palpi long, third segment shorter than the second, fourth about as long as the second and third combined. Ligula very broad, paraglossae short, palpi moderately thick, second segment about as long as the third. Mentum strongly transverse, feebly emarginate. Pronotum about as broad as the elytra, not margined behind. Elytra usually exposing the entire pygidium; epipleurae narrow, nearly vertical, and attaining the apices. Prosternal process slightly expanded between the coxae, elevated, not covering the mesosternum. Mesosternum not carinate. First ventral segment as long as the next three combined, segments two to four about of equal length, fifth as long as the third and fourth. Tibiae greatly constricted basally, more or less obsoletely spinous externally; anterior tarsi broadly dilated,

middle somewhat less broadly and the posterior more or less feebly dilated. Claws simple. Male eighth dorsal segment visible from beneath.

Because of being modified for tunnels, this genus appears to be nearest to *Glischrochilus* but is actually much more closely related to *Cryptarcha*.

Pityophagus is Holarctic and contains nine species. Evidently the genus arrived from Siberia, because it extends into Mexico but is very rare in eastern North America.

Key to Nearctic Pityophagus

1. Head with a transverse occipital impression, no fovea on vertex. . 2
   Head with a deep fovea on vertex, and obsolete, transverse, occipital impression . . . . . *verticalis*
2. Length 6–7 mm., western states to Ohio. . . . . *rufipennis*
   Length 5 mm., Penn. and D. C. . . . . *cephalotes*

Pityophagus verticalis Horn

Pityophagus verticalis Horn, 1879, Trans. Amer. Ent. Soc., **7**, 325.
Type: holotype no. 3213 from Colorado (Morrison collector) in the Philadelphia Acad. Nat. Sci.

Elongate, moderately convex, shining, dark rufo-piceous. Head densely, coarsely punctate, labrum with two distinct foveae, the vertex with a deep, longitudinal fovea, behind which is a more or less obsolete transverse impression. Prothorax with width to length as 1.1 to 1, sides nearly straight, narrowed posteriorly, surface with moderately dense and coarse, oval punctures. Elytra punctate as in the pronotum, punctures coarse at base, sutural striae evanescent anteriorly. Clypeus deflexed in front, bearing two large foveae in the middle. Margin of pygidium strongly elevated. Tibiae obsoletely spinous. Length 6–6.5 mm.

This species is more depressed than *rufipennis* and agrees with *insignis* from Chihuahua, but Sharp mentions only the transverse impression on the head. It agrees with *insignis* in the remarkable labrum.

This species occurs (May–July) in Colorado (type) and Arizona (Williams, Flagstaff in the U.S.N.M.) and New Mexico in the M.C.Z. (Eddy coll.).

Pityophagus rufipennis Horn

Plates 11, figs. 1–8; pl. 13, fig. 11

Pityophagus rufipennis Horn, 1872, Trans. Amer. Ent. Soc., **4**, 146.
Type: one lectotype no. 3214 from Oregon in the Philadelphia Acad. Nat. Sci. and one cotype no. 7971 from Vancouver, British Columbia in the M.C.Z. (Leconte coll.).

Elongate, convex, shining. Color usually dark castaneous with rufotestaceous elytra; head and pronotum sometimes piceous or black and very rarely the elytra may be dark piceous also. Head moderately densely and coarsely punctate; vertex not impressed, but a transverse impression on the occiput. Prothorax with width to length as 1 to 1, sides nearly straight, slightly narrowed posteriorly, surface with rather sparse, moderate punctures. Elytra slightly more finely and densely punctate than the pronotum, finely alutaceous. Margin of pygidium strongly elevated. Tibiae obsoletely spinous. Length 4.4–7 mm.

This species occurs (April–August, chiefly in May) from British Columbia (Pender Harbor, Vancouver, Beaverfoot Range) south through Washington (Port Angeles, Pullman, Skokomish River), Idaho (Moscow), Oregon (Hood River, Scarpoose, Mt. Hood) to California (Lake Tahoe, Fresno, Carmel, Marin Co., McCloud, Mt. Wilson, San Bernadino Mts.) and Nevada (probably the extreme western part); also one from "Ohio" collected by Blaisdell (Cal. Acad. Sci.: Blaisdell coll.).

Pityophagus cephalotes Leconte

Pityophagus cephalotes Lec., 1866, Proc. Acad. N. S. Philad., p. 377.
Type: from Pennsylvania, no. 6986, in the M.C.Z. (Leconte coll.).

Elongate, convex, shining. Color uniformly rufo-piceous, elytra slightly darker. Head with a transverse impression on the occiput. Prothorax as wide as long. Punctation as in *rufipennis*. Margin of pygidium strongly elevated. Middle tibiae spinous. Length 5 mm.

This species is known from the type and a specimen collected on a fence south of the Treasury Building, Washington, D. C., and probably in the Carnegie Museum (Ulke coll.).

Cryptarcha Shuckard

Plates 10, 13

Cryptarcha Shuck., 1839, Element. Brit. Ent., p. 165.
Genotype: *Nitidula strigata* F.

Size small to large, almost always pubescent, moderately convex. Head large and broad, clypeus not at all evident. Antennae as long as the head, first segment enlarged, second convex, shorter than the third, third to fifth slender, sixth to eighth short and convex, club variable, more or less oval, loose or compact. Antennal grooves short and convergent. Mandibles simple or feebly bifid at tip, feebly bearded, in the males of some species the right mandible is much longer than the left. Lacinia long, rounded at tip, feebly bearded. Maxillary palpi long, first segment as long as the third, fourth as long as the second and third combined. Ligula very broad, paraglossae small, palpi thick, second segment as long as the third. Mentum strongly transverse, very feebly emarginate in front. Prothorax as broad or broader than the elytra, posterior margin overlapping the elytra. Scutellum not large. Elytra entire, exposing none or only the tip of the pygidium. Prosternal process prolonged behind the coxae and laminiform. Anterior coxae open behind. First ventral segment longer than the second and third combined, about as long as the fifth, second to fourth of equal length. Tibiae slender, spinulose externally; anterior tarsi broadly dilated, middle and posterior tarsi moderately dilated; claws simple. Male eighth dorsal segment not or only slightly visible from beneath.

Cryptarcha is most nearly related to *Liarcha* Sharp from Middle America. Of the Nearctic genera, it is nearer to *Pityophagus* than to *Glischrochilus*.

This cosmopolitan genus contains about 120 species. Of the six Nearctic species, all but one (*strigatula*) show Neotropical affinities. These beetles occur at sap of deciduous trees and fly readily to light.

Key to Nearctic subgenera

1. Prosternum broad between the coxae and extending beyond the middle of the mesosternum; anterior margin of the metasternum transverse or broadly rounded anteriorly; species usually longer than 4 mm. ..... *Cryptarcha* s.str.

2. Prosternum more or less narrow between the coxae and not extending beyond the middle of the mesosternum; anterior margin of the metasternum acutely rounded anteriorly; species usually shorter than 4 mm. ..... *Lepiarcha*

Subg. Cryptarcha s. str.

Key to Nearctic species (and STRIGATA)

1. Unicolorous above 2
   Elytra with irregular pale fasciae 3
2. Apex of prosternal process rounded . . . . . *ampla*
   Apex of prosternal process truncate . . . . . *glabra*
3. Apex of prosternal process emarginate . . . . . *strigata*
   Apex of prosternal process rounded . . . . . *strigatula*

Cryptarcha ampla Erichson

Plates 10, figs. 24–31; pl. 13, fig. 14

Cryptarcha ampla Er., 1843, in Germar, Zeitschr. für Ent., **4**, 356.
Type: from Pennsylvania in the Berlin Museum.

Oblong oval, more obtuse in front, moderately convex, feebly shining, sparsely pubescent, sometimes almost glabrous above. Color varies from testaceous to nigropiceous. Prothorax feebly emarginate in front, sides slightly narrowed anteriorly, feebly arcuate, margins narrowly reflexed, hind angles obtuse, surface moderately finely and densely punctate. Elytra gradually narrowing posteriorly, lateral margins feebly reflexed, apices separately rounded, more obliquely so in the male, surface substriately punctate, without setae. Length 4.5–7.8 mm.

This species occurs at sap of maple and willow (April-Sept.) from Ontario and Quebec to Florida, west through Alabama (Mobile) to Texas, Missouri (St. Louis), Kansas, Iowa, Colorado, California and Oregon (Portland), but not in the southwest.

Cryptarcha glabra Schaeffer

Cryptarcha glabra Schaef., 1909, Bull. Brooklyn Mus., **1**, 375.
Type: from the Huachuca Mts., Arizona, August 9 in the U.S.N.M.

Oblong oval, moderately convex, glabrous, shining. Dark piceous to black above, paler beneath. Head moderately finely and sparsely punctate; mandibles unequal in the male. Prothorax with apex moderately emarginate, sides feebly arcuate anteriorly, nearly parallel posteriorly, hind angles rectangular, surface finely and sparsely punctate. Elytra gradually narrowing posteriorly, apices separately rounded, surface with six rows of fine punctures, intermixed with fine punctures. Beneath very feebly pubescent. Length 5–5.5 mm.

This species differs from *ampla* in being glabrous, darker, more parallel, and more finely punctate.

Known only from southern Arizona, *glabra* is represented by five specimens beside the type: Carr Canyon, Huachuca Mts., July 7–30 (Calif. Acad. Sci.), Kits Peak, Rincon, Baboquivari Mts. (A.M.N.H.), Baboquivari Mts., April, August (M.C.Z., Fall coll.), and San Bernadino Ranch, 3750 ft., Cochise Co., August in the writer's collection.

Cryptarcha strigatula Parsons

Cryptarcha strigata auctt. (*partim*).

Cryptarcha concinna Melsh., Reitter, 1873, *nec* Melsh., 1853, Syst. Eintheil. Nitid., p. 150.

Cryptarcha strigatula Pars., 1938, Psyche, **45**, 98–99, fig. 4.

Type: from the Bronx, New York City, August 15, 1896 in the writer's collection. Paratypes in the M.C.Z., A.M.N.H., C. A. Frost coll., and C. Parsons coll.

As the name implies, this species is a diminutive relative of *strigata*. It is very similar to *strigata*, egg-shaped, piceous, alutaceous, sparsely pubescent, with pale setae irregularly arranged on the pronotum but in seven indistinct rows on each elytron. The two transverse sinuous fasciae are much as in *strigata*, except that the anterior may reach the sutural margin of the elytra. The prosternal process is broadened and emarginate at the tip in *strigata*, but only slightly broadened and rounded at the tip in *strigatula*. The length is 2.7–3.5 mm., whereas the length of *strigata* is 3.2–4.2 mm. The minimum length of *strigata* is from the literature and must be very unusual, since the smallest specimen in the collections of the B.M., M.C.Z., U.S.N.M., and the writer measures 4.0 mm.

This species occurs (April–Sept.) from Massachusetts (Stoughton) to Florida (Orange Co.), west to Texas (Columbus) and Michigan.

Subg. Lepiarcha Sharp

Lepiarcha Sharp, 1891, Biol. Centr.-Amer., Col., **2** (pt. 1), 385.
Subgenotype: *Cryptarcha omositoides* Reitter.

Cryptarchula Ganglbauer, 1899, Käf. Mitteleur., **3**, 551.
Subgenotype: *Cryptarcha* (*Cryptarchula*) *imperialis* Fabr.

This subgenus contains at least the European *imperialis* and its allies, the Central American *omositoides* Reitter, and the following species.

Prosternal process greatly expanded at tip . . . . . *gila*
Prosternal process only slightly expanded at tip . . . . . *concinna*

Cryptarcha gila Parsons

Cryptarcha gila Pars., 1938, Psyche, **45**, 99–100, fig. 6.
Type: from Wheatfields near Globe, Arizona, May 4, 1934 in the writer's collection.

Elongate, piceous above, testaceous beneath. The anterior half of head, lateral fourths of the pronotum, epipleurae, and elytral fasciae testaceous. The upper surface closely punctate, finely pubescent, with numerous pale setae. The setae are arranged in eight rows on each elytron. The under surface obsoletely punctate and more sparsely pubescent. The prosternal process broadly expanded behind the coxae. The anterior and middle coxae pale testaceous. The mandibles are of equal length and notched at tip. Length 2.5–3.3 mm.

This species is more elongate and a little longer than *concinna*. The apices of the elytra are more pointed than in *omositoides* and *concinna*, agreeing in this respect with *imperialis*. The margins of the thorax and the epipleurae are more narrowly reflexed than in *concinna* and more broadly reflexed than in *imperialis*.

This species occurs (April–June) in California (Bakersfield, paratypes in Cal. Acad. Sci.) and Arizona (Ft. Yuma, Catalina Springs, Globe, Chiricahua Mts.).

Cryptarcha concinna Melsheimer

Cryptarcha concinna Melsh., 1853, Cat. of the desc. Coleop. of U. S., p. 41.
Cryptarcha liturata Lec., 1863, List Coleop. of N. Amer., **1**, 30.
Cryptarcha picta Melsh., 1866, Proc. Acad. N. S. Philad., **2**, 107.
Cryptarcha bella Reitter, 1873, Syst. Eintheil, Nitid., p. 150.
Types: of *concinna* from Pennsylvania in the M.C.Z. (Melsheimer coll); of *liturata* Lec. from Nebraska in the M.C.Z. (Leconte coll.); of *picta* Melsh. not found in the M.C.Z.; of *bella* Reit. from North America presumably in the National Museum, Budapest (Reitter coll.).

Similar to *strigatula*, but more regularly oval, less convex, more explanate pronotal margins, and the prosternal process narrower and more acutely rounded at apex. Mandibles unequal in the male. Also this species is usually more pubescent than *strigatula*, consequently more shining. The markings may be absent; when present the sinuous fasciae of the elytra are usually entire. Length 2–3 mm.

This is an extremely variable species.

Its range is (April–Sept.) Massachusetts to Florida west to southern California and Oregon.

Glischrochilus Reitter

Plates 11, 13

Glischrochilus Reitter, 1873, Verh. nat. Ver. Brünn, **12**, 162.
Genotype: *Silpha quadripustulatus* L. = *Silpha quadripunctatus* L.
Ips Fabricius, 1776, Gen. Insect. Chilonii, pp. 23,213. (nec DeGeer, 1775).
Genotype: same as for *Glischrochilus*.
Librodor Reitter, 1884, Wien Ent. Zeit., **3**, 269, 270.
Genotype: *Cryptarcha ipsoides* Reitter.

Large, oblong, glabrous, shining. Head large, broad; clypeus indistinct. Antennae about as long as the head, first segment long and moderately convex, second more convex and shorter than the third, three to eight becoming progressively shorter and more convex, club broad oval, moderately compact. Antennal grooves rather long, convergent. Labrum transverse, connate with the clypeus. Mandibles more or less strongly and bluntly bifid at tip, feebly bearded. Lacinia attenuate at tip, feebly bearded; second segment of palpi slightly longer than the third, fourth as long as the first. Ligula broad, emarginate at apex, paraglossae long, horn-shaped; palpi long and slender, second and third segments about of equal length. Mentum strongly transverse, deeply emarginate in front. Prothorax as broad or broader than the elytra, not margined at base. Scutellum small. Elytra entire, exposing none or only the tip of the pygidium; epipleurae narrow. Prosternum prolonged behind the coxae, laminiform, never attaining the metasternum. Anterior coxae open behind. First ventral segment nearly as long as the next three together, fourth longer than the third. Male eighth dorsal segment often invisible, visible only from beneath.

This is the most derivative genus of the Nitidulidae and most nearly related to *Pityophagus*.

The species breed in fleshy fungi.

Glischrochilus contains about 35 species, generally distributed except in Africa. The species are found at sap, rotten fruit, and in tunnels of Scolytidae.

Key to Nearctic species

1. Body wider, its width never less than two-fifths its length; moderately convex; often not quite parallel. Intercoxal process of prosternum broadly rounded at apex. Legs rather stout; at least the anterior tarsi strongly dilated. Subgenus *Librodor* Reitter 2

Body narrower, its width never greater than two-fifths its length; convex or depressed; parallel. Intercoxal process of prosternum truncate at apex. Legs slender, tarsi never strongly dilated. Subgenus *Glischrochilus* s. str. 8

2. Metasternum and abdomen red 3
   Metasternum and abdomen black 4
3. Elytron red, the apical third, humeral angle, and a submedian spot black ..... *sanguinolentus sanguinolentus*
   Elytron black, with a transverse basal and a submedian spot red ..... *sanguinolentus rubromaculatus*
4. Length 7.5 mm. or more; elytron with two moderately large, subcircular, red spots ..... *obtusus*
   Length less than 7.5 mm.; elytral spots variable but never at one time large, red, and circular 5
5. Elytral spots large, the basal distinctly trilobed, the basal and post-median equidistant from the suture ..... *fasciatus*
   Elytral spots variable, the basal oblique and quadrate when large, the postmedian more sutured than the basal 6
6. Elytral spots very small, pale yellow, the basal slightly longer than the scutellum and parallel to suture, the post-humeral spot when present distant from the basal by twice the length of the latter, the post-median spot occupying one-fourth of the elytral width ..... *siepmanni*
   Elytral spots usually much larger, reddish when small, the basal only very rarely parallel to the suture, the post-humeral when present less distant from the basal 7
7. Elytral spots smaller, the basal usually sublunate, sometimes subquadrate, the post-median occupying not more than three-fifths of the elytral width ..... *quadrisignatus quadrisignatus*
   Elytral spots larger, the basal subquadrate, the post-median occupying seven-tenths of the elytral width ..... *quadrisignatus canadensis*
8. Elytron with the spots pale yellow, small, and linear, from three to five in number, sometimes united to form narrow lines or very rarely reduced to a very small, obsolete basal and post-median spot ..... *vittatus*
   Elytron with reddish markings which are never linear, rarely immaculate 9
9. Body almost three times as long as wide, rather strongly convex; lateral margins of pronotum straight, converging slightly towards the base ..... *lecontei*

Body shorter, less convex, lateral margins of pronotum moderately and evenly arcuate or converging strongly in basal two-fifths. 10

10. Post-median spot of elytron strongly emarginate on its posterior margin ..... *confluentus*

Post-median spot of elytron variable, rarely lacking, but never with the posterior margin emarginate ..... *moratus*

The species are described in a slightly different order than above, an arrangement that shows their relationships more accurately.

Glischrochilus obtusus (Say)

Ips obtusa Say, 1835, Boston Journ. Nat. Hist., **1**, 168.

Type: from eastern United States is lost, but there is an autotype collected under rotten chips on Oct. 10, 1827 at Milton, Mass. which is here designated the neotype. It is in the T. W. Harris collection now on deposit in the M.C.Z.

Large, robust, oblong; punctation moderately dense and distinct, elytra more finely and obsoletely punctate than the pronotum. Color dark rufo-piceous to black, usually black; each elytron with a basal and a post-median red spot; each spot subcircular, occupying about half the width of the elytron; the basal spot equidistant from the sutural and lateral margins; the post-median spot a trifle smaller and situated slightly closer to the sutural than to the lateral margin. In the female the pygidium is very broadly rounded at apex, the apical portion of disc broadly depressed and slightly concave. In the male the distal halves of the middle and posterior tibiae are suddenly widened and the pygidium truncate at apex, its disc not concave. In the female the pygidium is more coarsely punctate and the elytral apices slightly more oblique than in the male. Length 7.5–12.5 mm.

This species occurs (May–August) from New York (Hillburn, Long Island) to South Carolina (Clemson), west through Kentucky (Bee Spring) to Louisiana (Opelousas), Arkansas (South West), and north to Michigan (Detroit).

Glischrochilus sanguinolentus sanguinolentus (Oliv.)

Nitidula sanguinolenta Oliv., 1790, Entomologie, **2**, No. 12, p. 8; pl. 2, fig. 14.

Type: from Georgia and Carolina presumably in the Paris Museum.

Oblong, slightly oval; pronotum finely and sparsely punctate; elytra more coarsely and densely punctate than the pronotum. Color black

except as follows: metasternum and abdomen pale red; elytra pale red, each with the humeral angle, a submedian black spot, and apical third, black; the submedian spot circular, situated slightly in front of the middle, equidistant from the lateral and sutural margins and occupying from three-eighths to five-ninths of the width of the elytron, much larger than the humeral spot; elytral epipleura colored like adjacent portions of the disc. In the female the elytra have the apical margins strongly oblique and slightly sinuate before the strongly produced apical angles, the pygidium has a broadly and deeply impressed longitudinal line in about the median half. In the male the elytra have the apical margins broadly rounded and the apices feebly produced, the pygidium with or without a fine median line and its apex more obtuse than in the female. Legs not modified sexually. Length 4.5–6.2 mm.

This species occurs (April–Nov. 5, chiefly in April) from Ontario (St. Eugene, Sudbury, Ottawa) and Quebec (Montreal, Hull) to Florida, west to "Tex." (A.N.S.P.), Iowa (Iowa City), Wisconsin, Alberta (Edmonton), and British Columbia (Trinity Valley).

Glischrochilus sanguinolentus rubromaculatus (Reitter)

Ips rubromaculatus Reitter, 1873, Verh. nat. Ver. Brünn, **12**, 161.
Type: from Florida presumably in the Stettin Museum (Dohrn coll.).

Similar to typical *sanguinolentus* but differing as follows. Elytra black, each with a basal and post-median red spot; the basal spot transverse, extending from the humeral umbone to a point near the suture (often attaining the suture), attaining the base only near the umbone, the elytral suture reddish near the spot; the post-median spot situated slightly behind the middle, strongly tranverse, feebly arcuate, the posterior margin convex, separated from the sutural and lateral margins of the elytron by distances equal to half the width of the scutellum; subequal in length to the basal spot.

Although intergradations rarely occur, this variation is usually constant. It is hardly worth a name, however.

This subspecies occurs (April–August) from Quebec (Charlesbourg, Knowlton), New Brunswick (Bathurst), and Nova Scotia (Kentville) to Florida, but no further west than New York (Buffalo), Pennsylvania (Warren Co.), and West Virginia.

Glischrochilus fasciatus (Oliv.)

Nitidula fasciata Oliv., 1790, Entomologie, **2**, no. 12, p. 7; pl. 2, fig. 12.
Ips **4**-*maculosa* Melsh., 1844, Proc. Acad. Nat. Sci. Philadelphia, **2**, 107.
Ips geminatus Melsh., 1844, Proc. Acad. Nat. Sci. Philadelphia, **2**, 108.
Types: of *fasciatus* from Georgia and Carolina presumably in the ParisMuseum; of **4**-*maculosa* and *geminatus* from Pennsylvania in the M.C.Z. (Melsheimer coll.).

Oblong, slightly oval; moderately finely and sparsely punctate. Color black except as follows. Elytra black, each with a large basal and a post-median orange or reddish-yellow spot; the basal spot with its greatest length equal to its greatest width, separated from the suture by a distance not greater than half the width of the scutellum, a little closer to the lateral margin of the elytron, the spot strongly emarginate on its posterior margin and at the humeral umbone and therefore trilobed, sometimes emarginate on its sutural margin; the post-median spot strongly transverse, about half as long as the basal spot and occupying at least two-thirds of the elytral width, equidistant from the sutural and lateral margins of the elytron. Legs and pygidium not sexually modified. In the female the elytra have the apical margins strongly oblique and the apices strongly produced. In the male the elytra have the apical margins slightly oblique and the apices slightly produced. Length 4–7 mm.

This species occurs (April–October, chiefly in April and May) from Ontario (Hastings Co., Vineland Station, Niagara) and Quebec (Hull, Kazubazua) to Florida (Quincy) west to Missouri, Kansas (Topeka), Iowa (Ames, Mt. Pleasant), Athabasca, Oregon, and British Columbia (Vancouver); also New Mexico.

Glischrochilus siepmanni Brown

Glischrochilus siepmanni Brown, 1932, Can. Ent., **64**, 259–260.
Type: from Fairy Lake, Hull, Quebec, no. 3376, in the Canadian National Collection, Ottawa and a paratype from Manitoba in the U. S. N. M.

Very closely related to *quadrisignatus;* oblong; shining; convex; pronotum slightly more finely and much more sparsely punctate than the elytra. Color brown or black, usually black; each elytron with a small, pale, yellow basal and post-median spot; the basal spot elongate, oval, and parallel to the suture, slightly longer than the scutellum, twice as long as wide, attaining the elytral base and situated midway between the lateral and sutural margins of the elytron; the post-median spot situated at apical third midway between the sutural and lateral margins of the elytron, occupying one-fourth the elytral width,

slightly oblique, broadly oval, a little larger than the basal spot. In some specimens there is an oval spot directly behind the humeral umbone. It is never more than half as large as the basal spot and is separated from the basal spot by a distance equal to twice the length of the latter. Elytral apices sexually unmodified. Length 4–6.2 mm.

This species tends to be slightly more finely punctate and more slender than *quadrisignatus*, but can be easily distinguished by the characteristic elytral spots and the flagellum (figured by Brown, Can. Ent., 64:260).

This species occurs (April–Sept., chiefly in the spring) from Ontario (Beaver Mine, Ottawa, Arnprior) and Quebec (Charlebourg, Montreal Ft. Coulonge) to New York (Staten Island), west through Michigan (Detroit) to Kansas (Riley Co.), Iowa (Iowa City), and west in Canada through Manitoba (Aweme), Alberta (Edmonton) to British Columbia (Midday Valley, Merritt, Vernon) and Oregon.

Glischrochilus quadrisignatus quadrisignatus (Say)

Plates 11, figs. 9–16; pl. 13, fig. 13

Ips **4**-*signatus* Say, 1835, Boston Journ. Nat. Hist., **1**, 169.

Ips similis Melsh., 1844, Proc. Acad. Nat. Sci. Philadelphia, **2**, 108.

Ips bipustulatus Melsh., 1844, Proc. Acad. Nat. Sci. Philadelphia, **2**, 108. (*nec* Fab., 1787, Mant. Insect. Hafniae, 1:45).

Ips bipunctatus Melsh., 1844, Proc. Acad. Nat. Sci. Philad., **2**, 108. (*nec* Fab., 1787, Mant. Insect. Hafniae, 1:45).

Ips quadrisignatus sexpustulatus Reit., 1873, Verh. nat. Ver. Brünn, **12**, 161 (*nec* Fab., 1792, Ent. Syst. Hafniae, 1:512).

Types: of **4**-*signatus* from eastern United States is lost; of *similis*, *bisputulatus*, and *bipunctatus* all from Pennsylvania in the M.C.Z. (Melsheimer coll.); and of *sexpustulatus* from Florida presumably in the National Museum in Budapest (Reitter coll.).

Oblong, convex, punctation moderately dense and coarse, elytra punctate as in the pronotum. Color black except as follows: elytra black, each with a basal and post-median spot; the spots, especially the basal, variable in size and color; the basal oblique and partly enclosing the humeral umbone, usually sublunate, sometimes larger and subquadrate, sometimes reduced and divided to form two or three small spots, separated from the suture by a distance equal to or greater than the width of the scutellum, much closer to the lateral margin; the post-median spot transversely oval, never greatly reduced, occupying from one-third to three-fifths of the elytral width, a little closer to the sutural than to the lateral margin; the spots pale yellow or reddish yellow, often reddish when reduced. The apical margin

of each elytron broadly rounded, the apex not produced. Legs, pygidium, and elytra not sexually modified. Length 4–7 mm.

This species is more densely and slightly more coarsely punctate than *fasciatus*, also a little less convex, slightly more parallel, and lateral pronotal margins more strongly reflexed than *fasciatus*.

This species occurs (March 28–Sept., chiefly in April) from New Hampshire (Mt. Lafayette) to "Florida" (Reitter), west through Kansas (Topeka, Kawrence, Riley Co.) and Iowa (Mt. Pleasant, Ames) to Utah (Logan, Magna, Garland, Providence) and Wyoming (Bridger Basin).

Glischrochilus quadrisignatus canadensis Brown

Glischrochilus quadrisignatus canadensis Brown, 1932, Can. Ent., **64**, 259.

Type: from Vernon, British Columbia, no. 3377, in the Canadian National Collection at Ottawa, also paratypes in the U.S.N.M. and C. A. Frost coll.

Similar to typical *quadrisignatus* but differing as follows: elytral spots yellow; the basal spot large, subquadrate, oblique, separated from the suture by a distance equal to the width of the scutellum, the length of its sutural margin three-fifths as great as the length of its posterior margin; post-median spot transversely oval, a little smaller than the basal spot, occupying seven-tenths of the elytral width. Length 4–7 mm.

Since the number of individuals intermediate between this and the typical form are about as many as one would expect, it hardly seems necessary to retain this name, particularly since there is no geographical significance attached to it.

This subspecies occurs (April–August, chiefly in the spring) from British Columbia (Vernon, Enderby, Agassiz), Athabasca, Ontario (Vineland Station, Black Rapids, Ottawa), Quebec (Montreal), and Maine (Bethel) south to Oregon (Corvallis), Utah (Logan), New Mexico (Albuquerque), Kansas (Riley Co.), and South Carolina (Tryon).

Glischrochilus vittatus (Say)

Ips vittata Say, 1835, Boston Journ. Nat. Hist., **1**, 170.

Ips dejeanii Kirby, 1837, Richardson's Fauna Boreali-Americana, p. 107. pl. 2 fig. 4.

Ips sepulcralis Randall, 1838, Boston Journ. Nat. Hist., **2**, 19.

Types: of *vittatus* from "Arkansaw", probably eastern Colorado, is lost; of *dejeanii* from northern Canada is in the British Museum; of *sepulcralis* from Maine is lost.

Elongate, shining, slightly more elongate and less convex than *confluentus*, brown to black with the following elytral markings: pale yellow spots, three of these elongate, oval, arranged in a row parallel to and moderately distant from the suture, one basal, another at basal third (these often joined together), and the other at apical third, the spots except the basal frequently joined with two more external spots which are sometimes reduced or obsolete. The spots may be reduced to one very small basal and one very small apical spot on each elytron. Head finely, moderately densely punctate. Prothorax with sides moderately arcuate, more or less obliquely narrowed posteriorly and more or less sinuate before the subrectangular hind angles, the lateral margins narrowly reflexed, surface moderately densely and coarsely punctate. Elytra punctate as in the pronotum. Elytral apices rounded in the male and strongly produced in the female. Length 3.5–6 mm.

This species is most nearly related to *confluentus*.

This species occurs (April–Sept.) from Alaska, British Columbia (Vavenby, Midday Valley, Trinity Valley, New Westminster), Alberta (Banff Sp., Crowsnest, Edmonton), Manitoba (Lake Dauphin), Ontario (Beaver Mine, Sudbury), and Quebec (Montreal, Hull, Kazubazua) south to California, Nevada, Utah, Colorado (Glennhaven, Veta Pass), and in the east to North Carolina.

Glischrochilus confluentus (Say)

Engis confluenta Say, 1823, Journ. Acad. N. S. Philad., **3**, 195.
Ips confluens Lec., 1859, Writings of Thomas Say, **2**, 125.
Type: from "Missouri" (T. Nuttall coll.) is lost.

Elongate, shining, slightly more convex than *moratus* and distinctly less convex than *lecontei;* black, rarely brown, with the following elytral markings: the black areas consisting of the apical third, the lateral margin including the humeral umbone, the suture rather narrowly in basal third or half, a subsutural spot near base sometimes connected with the sutural stripe, and a large submedian spot rather narrowly connected to the lateral and sometimes to the sutural stripe. The color markings are more constant than in related species. Head moderately coarsely and densely punctate. Prothorax with sides more or less feebly obliquely narrowed in front and more distinctly narrowed posteriorly and variably sinuate before the subrectangular hind angles, lateral margins narrowly reflexed, surface rather densely

coarsely punctate. Elytra more densely and coarsely punctate than the pronotum. Elytral apices rounded in the male and feebly produced in the female. Length 4.2–6.2 mm.

This species occurs (March 28–Nov. 6, chiefly in April) from Ontario to Georgia, west through "Missouri" and Michigan (Gd. Ledge, Detroit) to Colorado and Nevada.

Glischrochilus moratus Brown

Glischrochilus moratus Brown, 1932, Can. Ent., **64**, 261–2.
Type: holotype male from Aweme, Manitoba, no. 3318 in the Canadian National Collection, Ottawa; paratype in the U.S.N.M.

Elongate, shining, less elongate and slightly less or as convex as *vittatus;* uniformly black except for the following elytral markings: the suture except in basal fifth and apical third pale red (red markings may rarely be absent along the suture), this red band extending externally at its apex and obliquely to a point behind the humeral umbone at its base, a branch extending from behind the umbone to the base near the scutellum; this band subequal in width throughout, its width and the distance separating it from the lateral margin behind the umbone and at apical third subequal to the width of the scutellum; very rarely the elytra may be immaculate or have only a basal spot on each elytron. Head moderately finely and densely punctate. Pronotal sides rather feebly arcuate, feebly sinuate before the subrectangular hind angles, surface sparsely and finely punctate, more coarsely punctate at the sides. Elytra more coarsely punctate than pronotal disc. The larger females are usually less convex than the males. Length 3.6–6 mm.

Although most closely related to *confluentus,* particularly in the shape of the prothorax and in the elytral markings, *moratus* differs in color and in being slightly less convex and more finely punctate.

This species occurs (March 29–Nov. 17) in British Columbia (Summerland, Copper Mt., Creston), Alberta (Cypress Hills, Edmonton, Leduc), Manitoba (Aweme), and Ontario (Beaver Mine); also "Texas, C. V. Riley coll." (U.S.N.M.).

Glischrochilus lecontei Brown

Ips cylindricus Leconte, 1863, Smithson. Misc. Coll., p. 64. (nec Olivier, 1790).
Glischrochilus lecontei Brown, 1932, Can. Ent., **64**, 262.
Type: from Eldorado Co., California, no. 6985, in the M.C.Z. (Leconte coll.).

Elongate, shining, moderately convex, more parallel and convex than any other North American *Glischrochilus* s. str. Color brown to black, rarely immaculate but usually with very variable and often obscure elytral markings as follows: pale red spots as in *moratus*, the basal spot subhumeral, more or less triangular, the posterior spot sometimes bent forward and extended to the suture, the spots may be absent or variable in degree of development. Head finely, rather sparsely punctate. Prothorax with sides nearly straight, slightly converging basally, rarely feebly, arcuately narrowed in front, hind angles obtuse, lateral margins very narrowly reflexed, surface finely, rather densely punctate. Elytra as finely but more densely punctate than the pronotum. Elytral apices rounded in the male, strongly produced in the female. Length 4.5–7.5 mm.

In Arizona, at least, this species has been collected in *Pinus ponderosa* and *strobiformis*. It occurs (March–October, Febr.) from British Columbia (Kelowna) and Manitoba (Aweme) south through Oregon (Sisters), Idaho (Smith's Ferry), South Dakota (Elmore, Black Hills), California (Mono Co.), Nevada, Colorado (Evergreen, El Paso Co., Douglas Co.) to Arizona (Santa Catalina Mts., Rincon Mts., Chiricahua Mts.) and New Mexico (Cloudcroft, Vermejo, Las Vegas Hot Springs).

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PLATES

PLATE 1

PLATE 1

Cateretes pennatus: 1, mentum, ligula, and labial palpi; 2, maxilla; 3, labrum, clypeus, and antenna; 4, mandible.

Cateretes pedicularis: 5, scape and pedicel.

Cateretes scissus: 6, scape and pedicel.

Cateretes pennatus: 7, lateral view of male genitalia; 8, ventral view of male genitalia; 10, lateral view of female genitalia; 11, ventral view of same.

Cateretes sericans: 9, lateral view of male genitalia; 12, ventral view of female genitalia.

Boreades abdominalis: 13, maxilla; 14, mentum, ligula, and labial palpi; 15, mandible; 16, clypeus and antenna; 17, labrum; 18, ventral view of female genitalia; 19–21, lateral, dorsal, and ventral views of male genitalia.

Brachypterus urticae: 22, mentum, ligula, and labial palpi; 23, female eighth sternite and spermatheca; 24, mandible; 25, maxilla; 26, labrum and antenna; 27, lateral view of male genitalia; 28, ventral view of male eighth sternite and tergite.

Brachypterolus pulicarius: 29, labrum and antenna; 30, ventral view of male eighth sternite and tergite; 31, mandible; 32, maxilla; 33, mentum, ligula, and labial palpi; 34, ventral view of female genitalia; 35, ventral view of male genitalia.

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PLATE 2

PLATE 2

Amartus rufipes: 1, mentum, ligula, and labial palpi; 2, mandible; 3, maxilla; 4, labial palpus with palpiger; 5, dorsal view of apex of ligula and paraglossae; 6, clypeus and antenna; 7, lateral view of female genitalia; 8, ventral view of male genitalia; 9, dorsal view of male eighth tergite and sternite; 10, labrum; 11, ventral view of female genitalia (8th sternite pulled apart); 12, showing normal relation of genitalia with eighth segment.

Anthonaeus agavensis: 13, lateral view of male genitalia; 14, mentum, ligula, and labial palpi; 15, mandible; 16, lateral view of female genitalia and eighth segment; 17, ventral view of female genitalia; 18, apices of coxites with styli; 19, ventral view of male eighth sternite and tergite; 20, labrum and antenna; 21, maxilla; 22, dorsal view of female eighth tergite with strut.

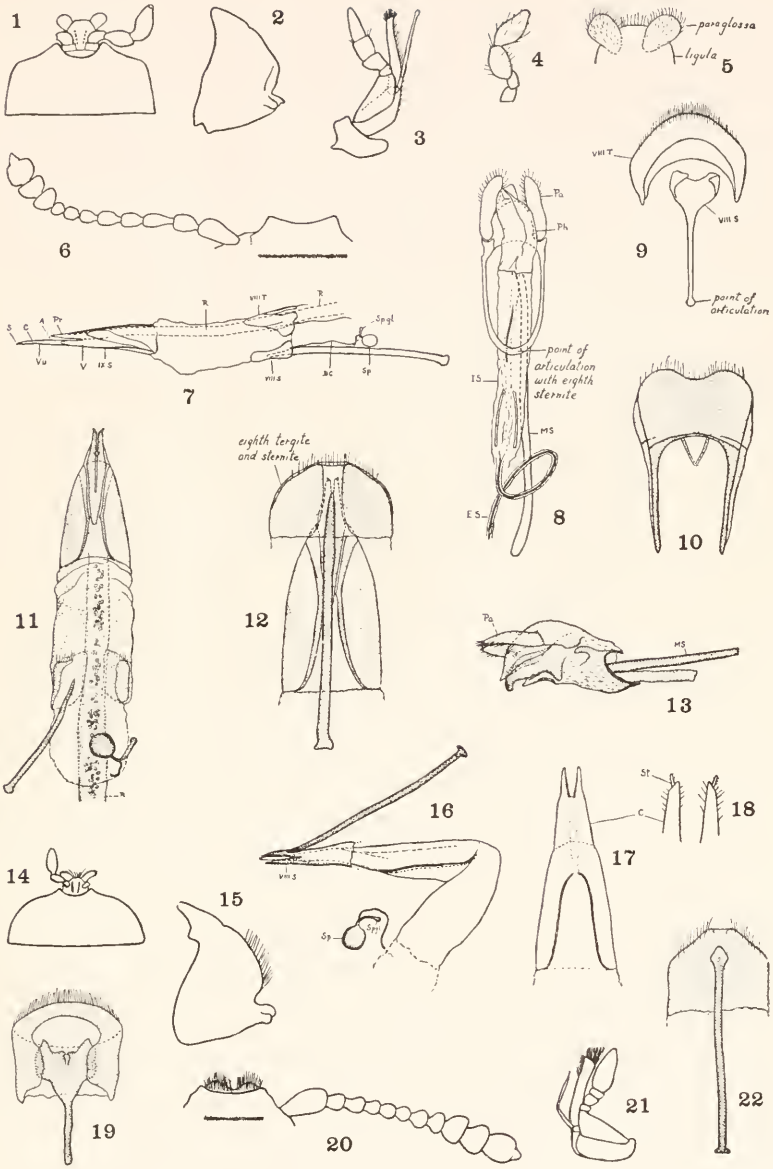
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PLATE 3

PLATE 3

Conotelus obscurus: 1, mentum, ligula, and labial palpi; 2, maxilla; 3, labrum; 4, mandible; 5, antenna; 6, ventral view of female genitalia; 7, lateral view of female genitalia; 8, 9, lateral and dorsal views of male genitalia; and 8th tergite; 10, ventral view of male genitalia without tergite.

Brachypeplus glaber: 11, maxilla; 12, mandible; 13, mentum, ligula, and labial palpi; 14, labrum and antenna; 15, 16, ventral and lateral views of male genitalia; 17, dorsal view of male eighth tergite and sternite.

Colopterus niger: 18, ventral view of phallobase; 19, ventral view of tegmen; 20, maxilla; 21, mandible; 22, labrum and antenna; 23, ventral view of female genitalia; 24, mentum, ligula, and labial palpi; 25, ventral view of male eighth sternite and tergite.

Carpophilus pallipennis: 26, mentum, ligula, and labial palpi; 27, maxilla; 28, ventral view of female genitalia; 29, ventral view of male genitalia showing relation to eighth segment; 30, 31, ventral and lateral views of male genitalia; 32, labrum and antenna; 33, mandible.

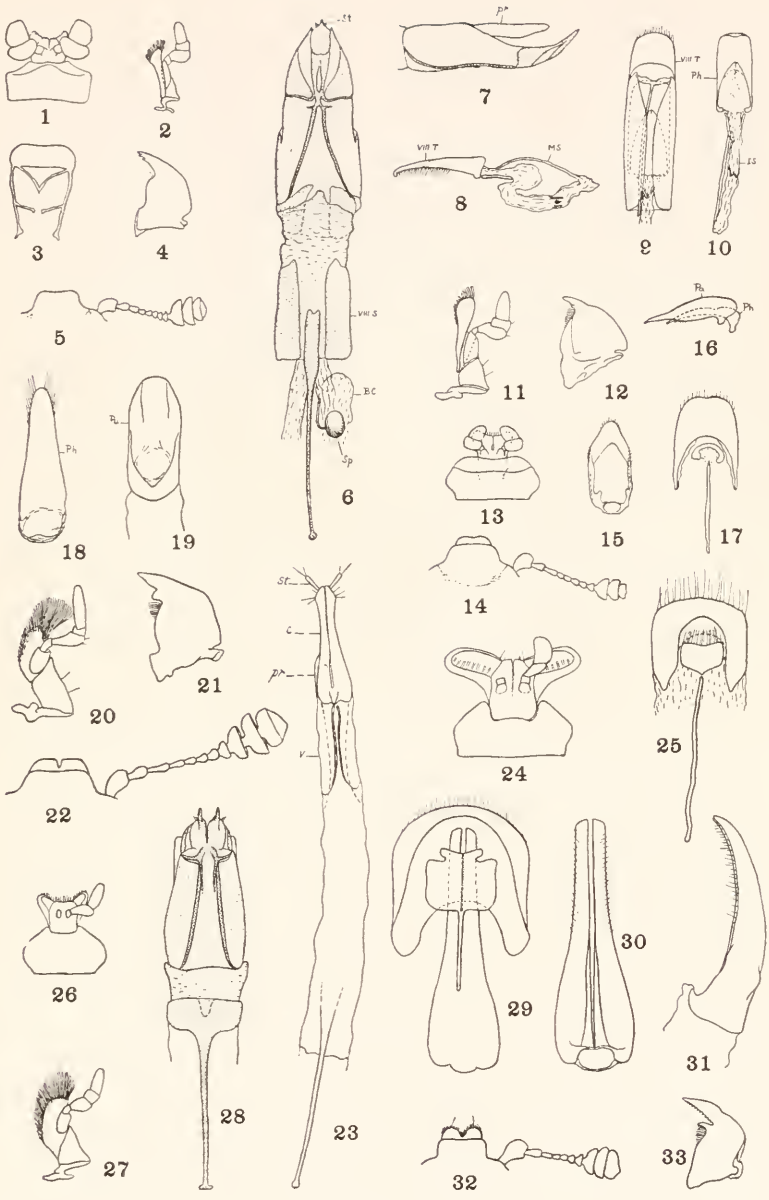
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PLATE 4

PLATE 4

Haptoncus luteolus: 1, mentum, ligula, and labial palpi; 2, labrum; 3, mandible; 4, maxilla; 5, female eighth sternite with strut; 6, ventral view of female genitalia; 7, ventral view of male genitalia; 8, labrum and antenna.

Epuraea helvola: 9, mentum, ligula, and labial palpi; 10, maxilla; 11, mandible; 12, labrum and antenna; 13, lateral view of male genitalia; 14, ventral view of male eighth sternite and tergite; 15, ventral view of male genitalia; 16, ventral view of female genitalia.

Stelidota geminata: 17, mentum, ligula, and labial palpi; 18, mandible; 19, maxilla; 20, labrum and antenna; 21, ventral view of male genitalia; 22, ventral view of male eighth sternite and tergite; 23, ventral view of female genitalia.

Omosita colon: 24, mentum, ligula, and labial palpi; 25, labrum and antenna; 26, maxilla; 27, mandible; 28, ventral view of male eighth sternite and tergite; 29, ventral view of male genitalia; 30, ventral view of female eighth sternite and strut; 31, ventral view of female genitalia.

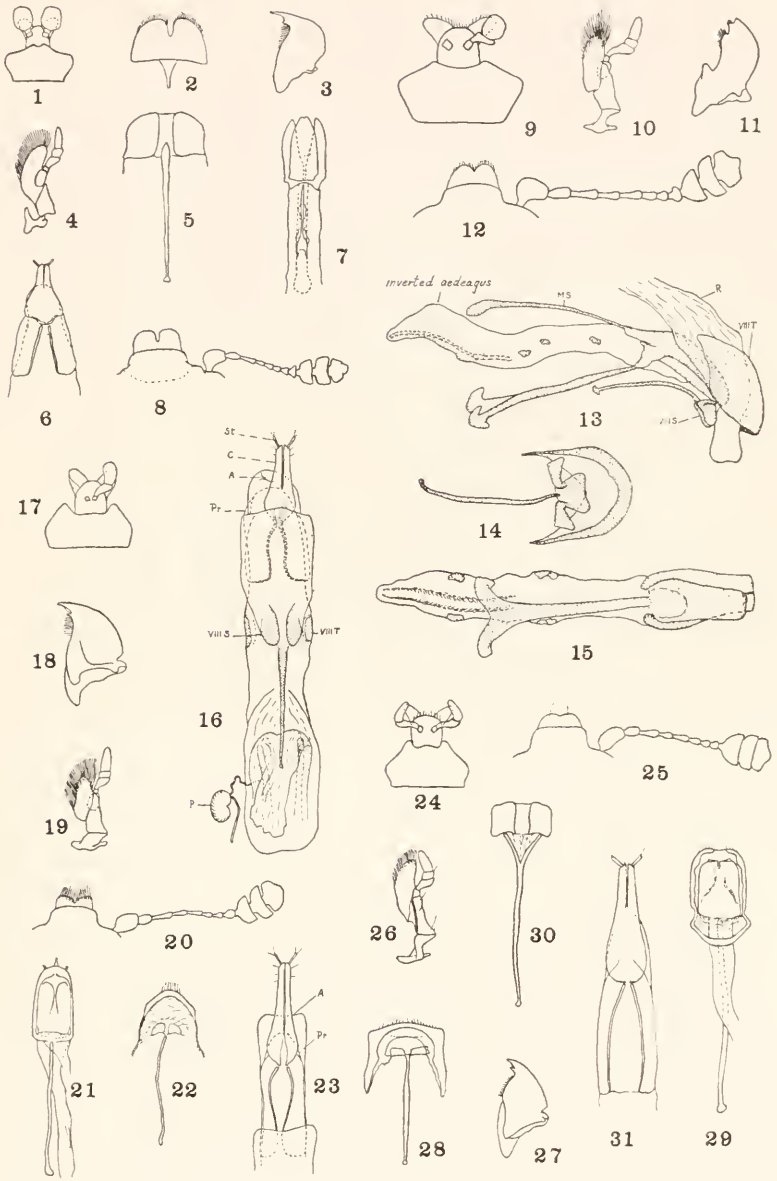
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PLATE 5

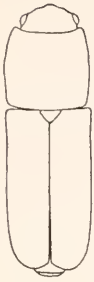
PLATE 5

Orthopeplus quadricollis: 1, dorsal view; 2, labrum, mandibles, and antenna; 3, labial palpi; 4, maxillary palpi; 5, pygidium and eighth dorsal segment of male.

Nitidula rufipes: 6, mentum, ligula, and labial palpi; 7, maxilla; 8, mandible; 9, clypeus, labrum, and antenna; 10, ventral view of female genitalia; 11, female eighth sternite and strut; 12, ventral view of male genitalia; 13, ventral view of male eighth sternite and tergite.

Prometopia sexmaculata: 14, mentum, ligula, and labial palpi; 15, maxilla; 16, mandible; 17, labrum and antenna; 18, ventral view of male genitalia; 19, ventral view of male eighth sternite and tergite; 20, female eighth sternite and strut; 21, ventral view of female genitalia.

Lobiopa undulata: 22, mandible; 23, mentum, ligula, and labial palpi; 24, maxilla; 25, ventral view of male eighth sternite and tergite; 26, ventral view of male genitalia; 27, labrum and antenna; 28, ventral view of female genitalia.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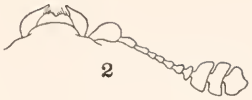
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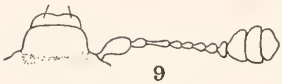
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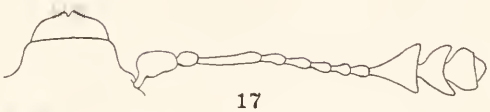
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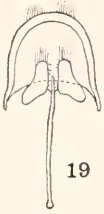
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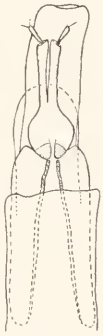
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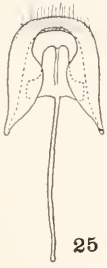
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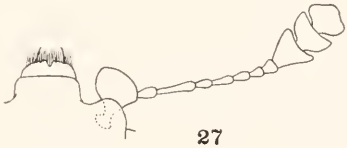
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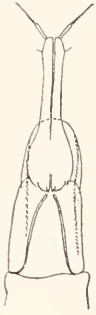
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PLATE 6

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Soronia punctatissima: 1, mentum, ligula, and labial palpi; 2, maxilla; 3, mandible; 4, labrum and antenna; 5, ventral view of male genitalia; 6, ventral view of male eighth sternite and tergite; 7, ventral view of female genitalia and eighth sternite.

Phenolia grossa: 8, mentum, ligula, and labial palpi; 9, maxilla; 10, mandible; 11, labrum and antenna; 12, ventral view of male genitalia; 13, ventral view of male eighth sternite and tergite; 14, ventral view of female sternite with strut; 15, ventral view of female genitalia.

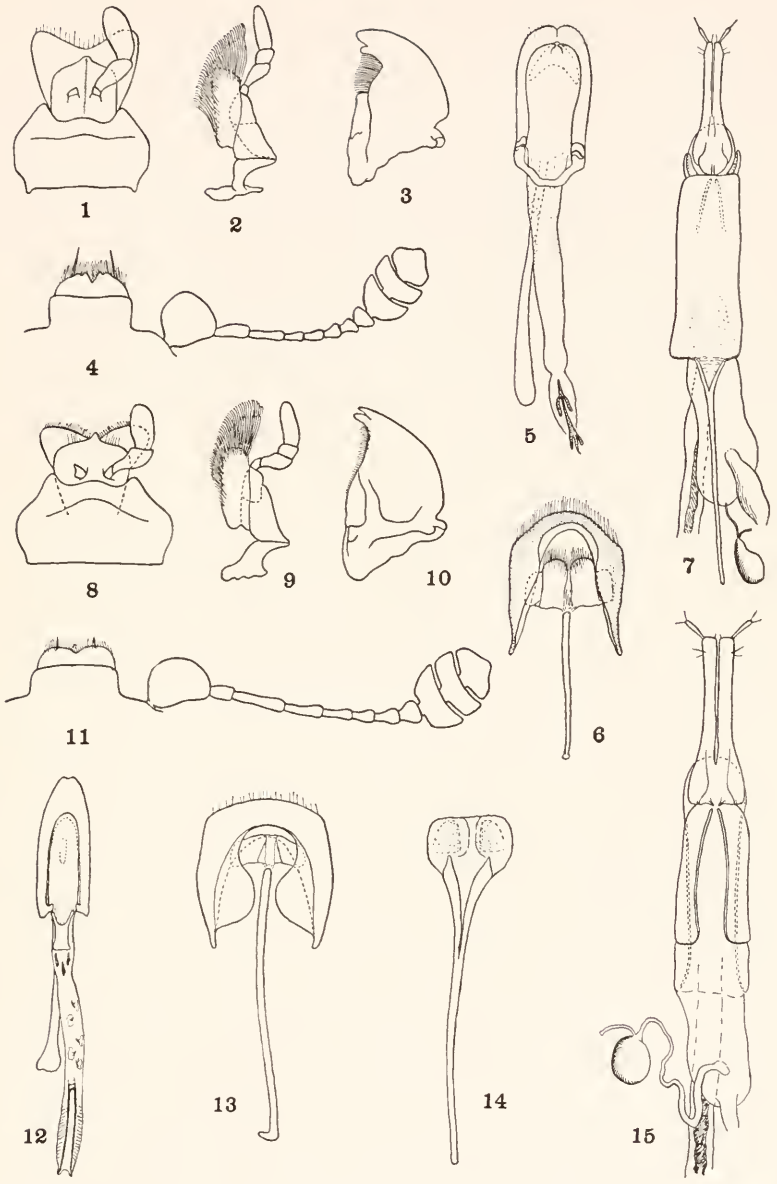
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PLATE 7

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Amphotis ulkei: 1, mentum, ligula, and labial palpi; 2, maxilla; 3, mandible; 4, labrum and antenna; 5, ventral view of male eighth sternite and tergite; 6, ventral view of male genitalia; 7, ventral view of female eighth sternite with strut; 8, ventral view of female genitalia.

Thalycra fervida: 9, mentum, ligula, and labial palpi; 10, maxilla; 11, mandible; 12, labrum and antenna; 13, ventral view of male eighth sternite and tergite; 14, ventral view of male genitalia; 15, ventral view of female eighth sternite with strut; 16, ventral view of female genitalia.

Perthalycra murrayi: 17, mentum, ligula, and labial palpi; 18, maxilla; 19, mandible; 20, labrum and antenna; 21, ventral view of female genitalia; 22, ventral view of male eighth sternite and tergite; 23, ventral view of female sternite with strut; 24, ventral view of male genitalia.

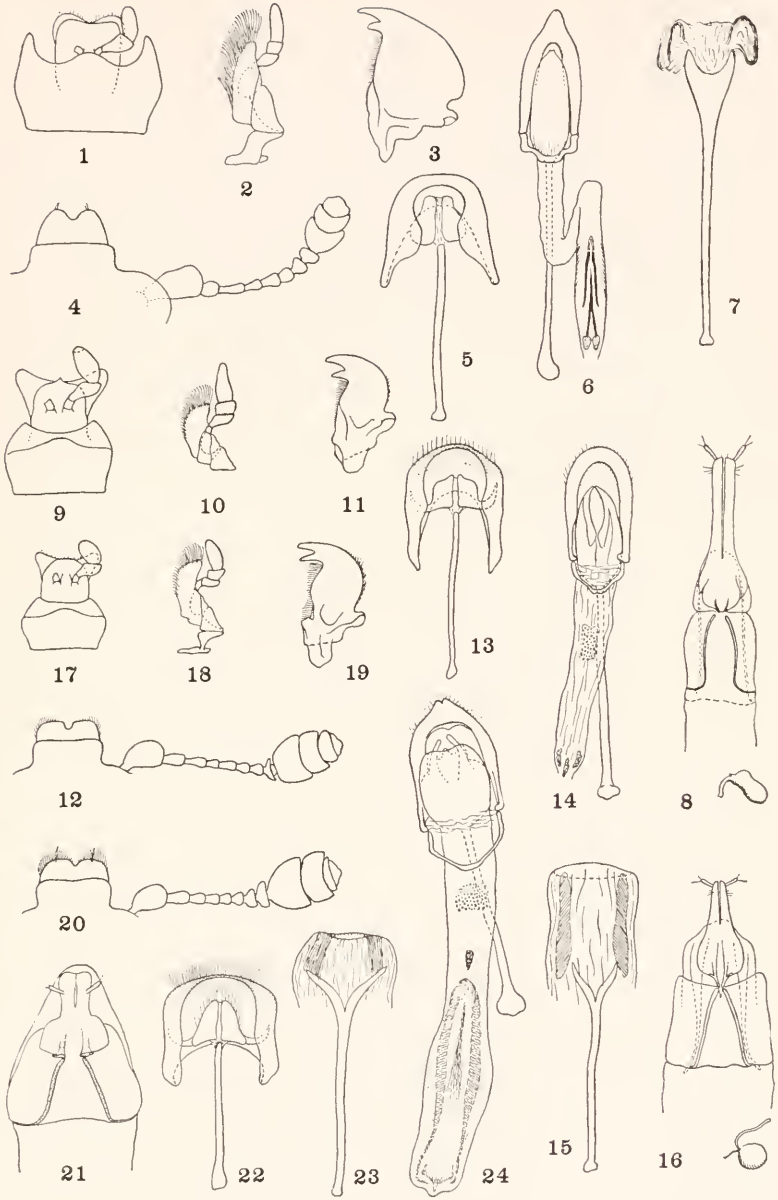
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PLATE 8

PLATE 8

Pocadius helvolus: 1, mentum, ligula, and labial palpi; 2, maxilla; 3, mandible; 4, labrum and antenna; 5, ventral view of male eighth sternite and tergite; 6, ventral view of male genitalia; 7, ventral view of female genitalia with eighth sternite; 8–11, profiles of the prosterna: 8, *P. basalis* (holotype), 9, *P. helvolus*, 10, *P. niger* (holotype), 11, *P. fulvipennis*.

Camptodes species (Bolivia): 12, mentum, ligula, and labial palpi; 13, maxilla; 14, mandible; 15, labrum and antenna; 16, ventral view of female genitalia; 17, ventral view of female eighth sternite and tergite with strut; 18, ventral view of male eighth sternite and tergite; 19, ventral view of male genitalia.

Amphicrossus ciliatus: 20, ventral view of male genitalia; 21, ventral view of female genitalia; 22, mentum, ligula, and labial palpi; 23, maxilla; 24, mandible; 25, ventral view of male eighth sternite and tergite; 26, labrum and antenna.

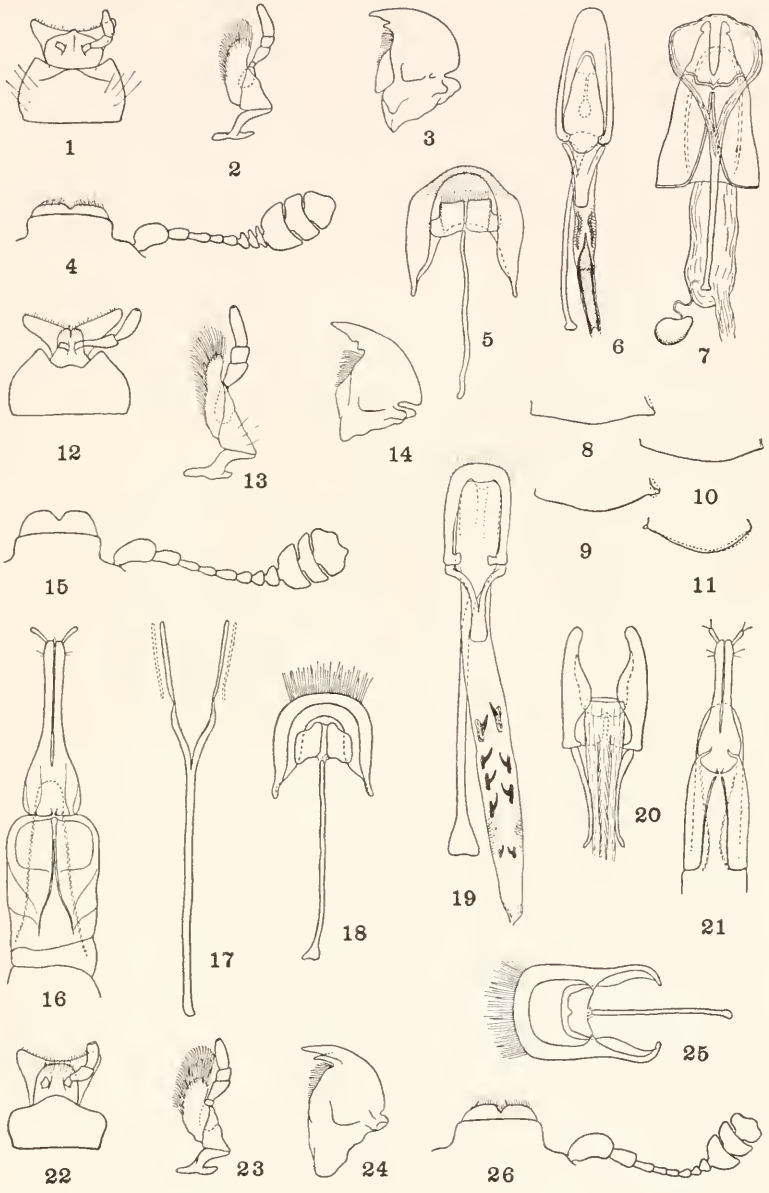
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PLATE 9

PLATE 9

Cychramus adustus: 1, mentum, ligula, and labial palpi; 2, maxilla; 3, mandible; 4, labrum and antenna; 5, ventral view of male eighth sternite and tergite; 6, ventral view of male genitalia; 7, ventral view of female genitalia.

Pallodes pallidus: 8, mentum, ligula, and labial palpi; 9, maxilla; 10, mandible; 11, clypeus, labrum, and antenna; 12, ventral view of female genitalia; 13, lateral view of male genitalia; 14, ventral view of male genitalia; 15, ventral view of male eighth sternite and tergite; 16, ventral view of female eighth sternite with strut.

Cyllodes biplagiatus: 17, mentum, ligula, and labial palpi; 18, maxilla; 19, mandible; 20, labrum and antenna; 21, ventral view of female genitalia; 22, ventral view of female eighth sternite and tergite with strut; 23, ventral view of male eighth sternite and tergite; 24, ventral view of male genitalia; 25, lateral view of apex of inverted aedeagus.

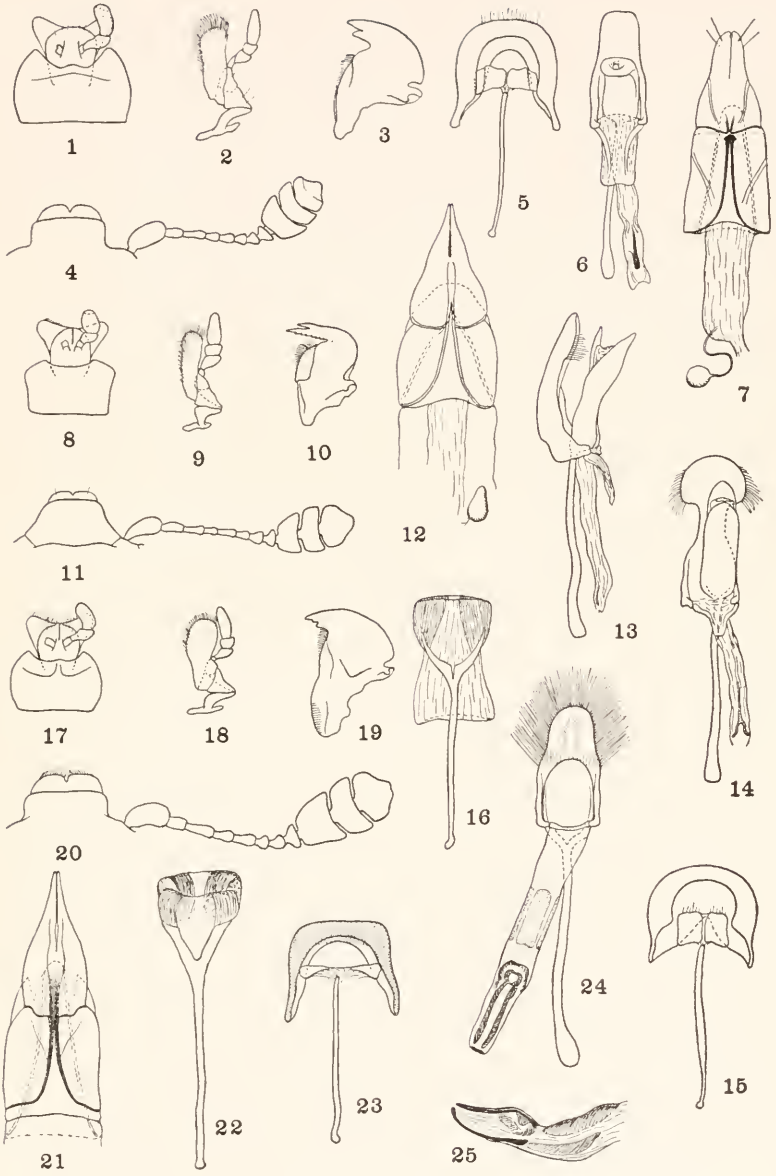
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PLATE 10

PLATE 10

Oxycnemus histrina: 1, mentum, ligula, and labial palpi; 2, maxilla; 3, mandible; 4, labrum and antenna; 5, ventral view of male eighth sternite and tergite; 6, ventral view of male genitalia; 7, ventral view of female genitalia; 8, ventral view of female eighth sternite.

Meligethes mutatus: 9, mentum, ligula (separated), and labial palpi; 10, maxilla; 11, mandible; 12, labrum (beneath clypeus) and antenna; 13, ventral view of male genitalia; 14, ventral view of male eighth sternite and tergite; 15, hypopygidium; 16, ventral view of female genitalia; 17, ventral view of female eighth sternite; 18–23, anterior tibiae of *Meligethes:* 18, *pinguis* (holotype), 19, *saevus* (holotype), 20, *aeneus* (holotype of *rufimanus*), 21, *aeneus* (holotype of *moerens*), 22, *seminulum* (holotype, and variations), 23, *mutatus* (holotype).

Cryptarcha ampla: 24, mentum, ligula, and labial palpi; 25, maxilla; 26, mandible; 27, labrum and antenna; 28, ventral view of male eighth sternite and tergite; 29, ventral view of female eighth sternite; 30, ventral view of male genitalia; 31, ventral view of female genitalia.

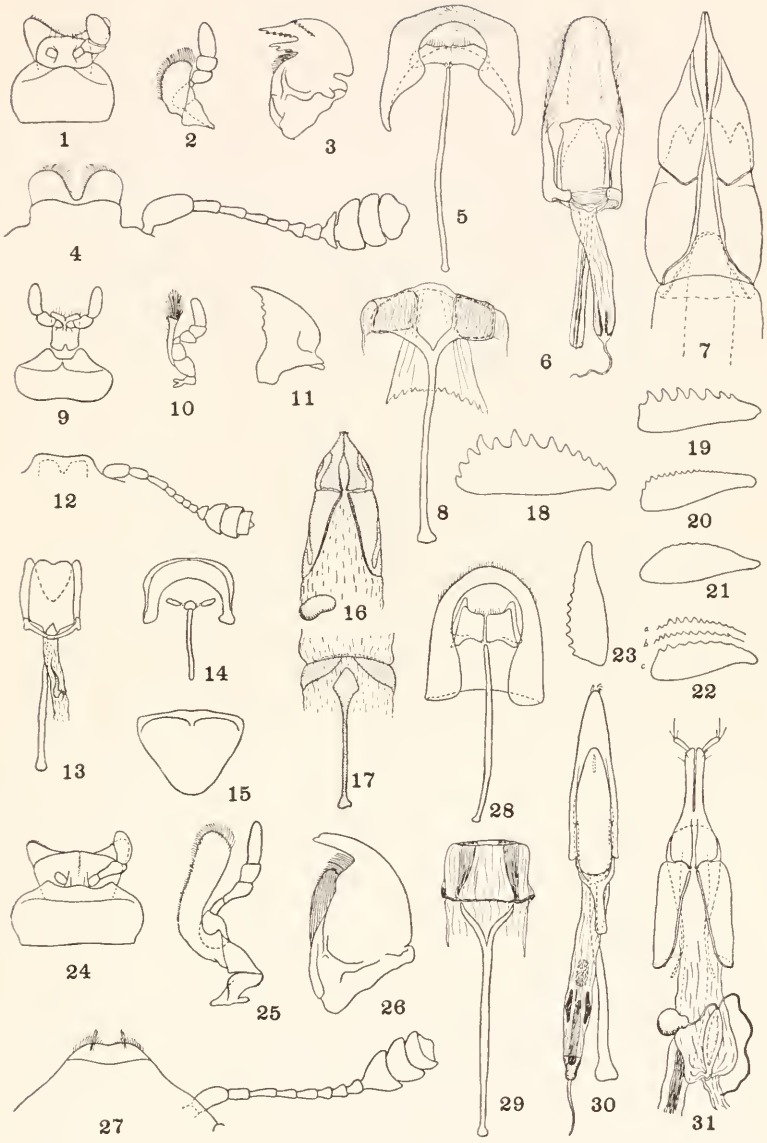
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PLATE 11

PLATE 11

Pityophagus rufipennis: 1, mentum, ligula, and labial palpi; 2, maxilla; 3, mandible; 4, labrum and antenna; 5, ventral view of male eighth sternite and tergite; 6, ventral view of male genitalia; 7, ventral view of female eighth sternite with strut; 8, ventral view of female genitalia.

Glischrochilus quadrisignatus: 9, mandible; 10, maxilla; 11, mentum, ligula, and labial palpi; 12, ventral view of female eighth sternite with strut; 13, labrum and antenna; 14, ventral view of male genitalia; 15, ventral view of male eighth sternite and tergite; 16, ventral view of female genitalia.

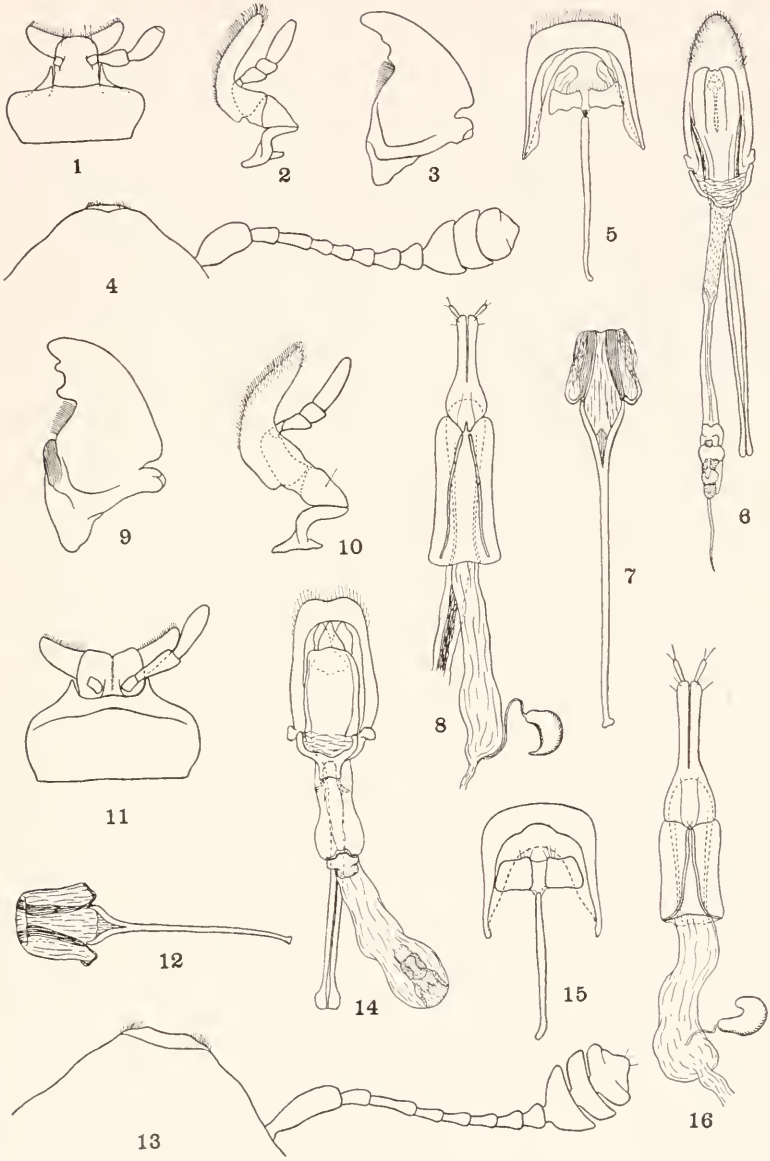
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PLATE **12**

PLATE 12

Hind wings of Nearctic Nitidulidae: 1, *Caterctes pennatus;* 2, *Boreades abdominalis;* 3, *Brachypterus urticae;* 4, *Brachypterolus pulicarius;* 5, *Amartus rufipes;* 6, *Anthonaeus agavensis;* 7, *Conotelus obscurus;* 8, *Brachypeplus glaber;* 9, *Colopterus unicolor;* 10, *Carpophilus pallipennis;* 11, *Haptoncus luteolus;* 12, *Epuraea helvola;* 13, *Orthopeplus quadricollis;* 14, *Stelidota geminata;* 15, *Omosita colon;* 16, *Nitidula ziczac;* 17, *Prometopia sexmaculata;* 18, *Phenolia grossa.*

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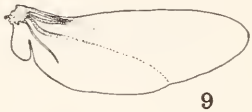

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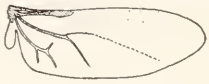

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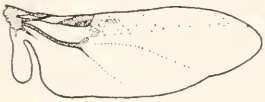

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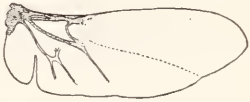

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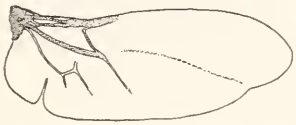

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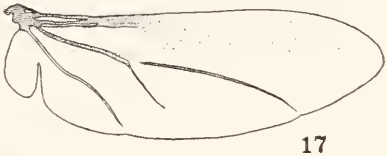

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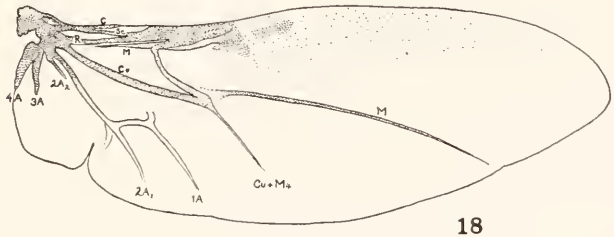

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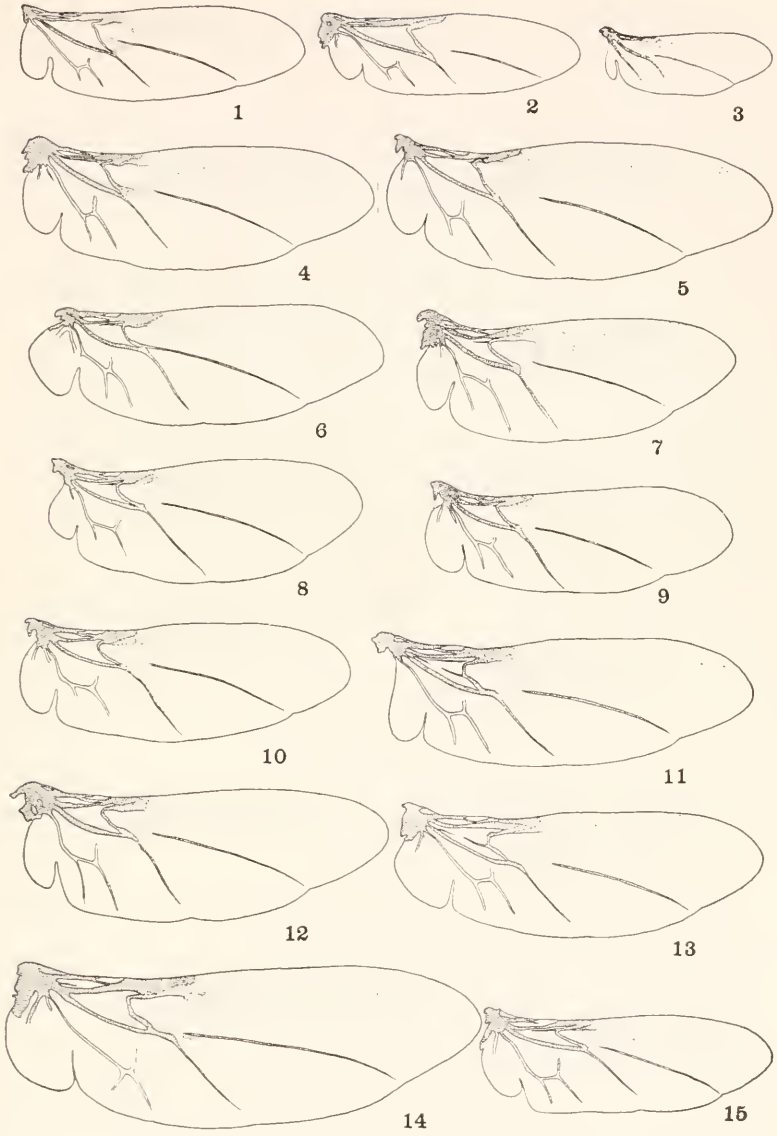
PLATE 13

PLATE 13

Hind wings of Nearctic Nitidulidae: 1, *Lobiopa undulata;* 2, *Amphotis ulkei;* 3, *Meligethes mutatus;* 4, *Thalycra fervida;* 5, *Perthalycra murrayi;* 6, *Amphicrossus ciliatus;* 7, *Camptodes texanus;* 8, *Pallodes pallidus;* 9, *Cychramus adustus;* 10, *Cyllodes biplagiatus;* 11, *Pityophagus rufipennis;* 12, *Oxycnemus histrina;* 13, *Glischrochilus quadrisignatus;* 14, *Cryptarcha ampla;* 15, *Pocadius helvolus.*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Bulletin of the Museum of Comparative Zoölogy
AT HARVARD COLLEGE
VOL. XCII, NO. 4

BIRDS OF THE HARVARD PERUVIAN EXPEDITION

BY J. L. PETERS AND J. A. GRISWOLD, JR.

WITH FIVE PLATES

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No. 4. — *Birds of the Harvard Peruvian Expedition*
1939

By J. L. Peters and J. A. Griswold, Jr.

INTRODUCTION

By J. A. Griswold, Jr.

In January 1939 I was sent to Perú, through the kindness of Dr. Thomas Barbour, director of the Museum of Comparative Zoölogy at Harvard College, to make general zoological collections in northern, southern and central Perú. Unfortunately I was only able to collect in central Perú as I was recalled to Cambridge to lead another expedition, which, however, had to be abandoned on account of war. Consequently almost all my collecting was done in the vicinity of Maraynioc, a locality made famous by von Tschudi, Jelski, and Kalinowski, and where so many ornithological discoveries had been made, the most outstanding being a genus of Cotingdae, *Doliornis sclateri* Tacz., collected by Jelski in 1874. It was mainly in the hope of getting this rare bird that I spent three months at Maraynioc, in which attempt, I might as well admit at once, I was unsuccessful.

I devoted my efforts mainly to birds and mammals, with the idea of trying to secure as many different species rather than long series, collecting 302 birds of 105 species, and 105 mammals of 20 species.

I left New York on January 28, 1939 and arrived at Callao on February 19th. I then spent 10 days in Lima making arrangements and gathering information concerning Maraynioc, and during this time also made a few one-day collecting trips to the following localities: Cajarmarquilla, Chosica, Santa Eulalia, Callahuanca, and Matucana.

On the first of March I left for Maraynioc, returning to Lima for two weeks from April 11th to 25th on account of the sudden death of Mrs. Marshall Hertig, the mother of David M. Hertig, whom I had engaged as assistant. Returning to Maraynioc, I worked there until the 25th of June, returned to Lima, and took the boat for New York on July 11th.

My thanks are especially due to Doctor Marshall Hertig of the Harvard Medical School, head of the Department of Medical Entomology in the Instituto Nacional de Higiene Salud Publica in Lima, for his cordial hospitality and helpful cooperation in Perú. Also my appreciation to David Hertig for his untiring and efficient efforts while accompanying me in the field as general assistant.

For all the facilities and cordial friendship extended to me, my

gratitude is due to Mr. Geoffrey W. Morhill, head of the Ferrocarril Central del Perú, and other officers of the Peruvian railroad system.

Grateful thanks are also due to Señores Maiback and Josi, administrators of the Hacienda Maraynioc, who very kindly offered David Hertig and me the hospitality and accommodations of the ranch, as well as giving us the necessary permission to collect there.

Thanks are also due to the Peruvian government for its courtesy, and to Dr. Albert A. Gieseck of the American Embassy.

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Collecting Localities

Cajamarquilla. 1,000 feet. Arid tropical. Extensive Inca ruins, situated ten miles northeast of Lima in the Rimac valley. Vegetation appearing only along the river and irrigated parts.

Chosica. 2,800 feet. Arid tropical. Small town situated in the Rimac valley some 40 kilometers north-east of Lima. The surrounding hills are steep, rocky and barren with only a little cactus and other such desert shrubs. Along the banks of the Rimac river and the irrigation ditches a more luxuriant growth of small trees, bushes, and rushes exists, but of no considerable extent, being divided up by small gardens, cotton and corn fields. Although only a short distance from Lima, it is quite different climatically, during the winter there usually being bright sunshine in Chosica while it is misty and drizzly in Lima.

Santa Eulalia. 3,500 feet. Also in the arid tropical belt and only 15 minutes higher up from Chosica in the Santa Eulalia valley. It is about here that the veruga zone starts, and anybody who has not been brought up in the veruga territory is almost sure to get this deadly disease if he spends so much as a night in the zone.

Santa Eulalia is very similar to Chosica but a little more vegetation consisting mainly of fruit trees of several varieties. The surrounding hillsides were barren like those in Chosica.

Callahuanca. 5,000 feet. Arid tropical. 42 miles north-east of Lima

in the Santa Eulalia valley. The surrounding hills not quite so barren as Chosica but still a desert flora. Veruga fever is prevalent.

Matucana. 8,000 feet. Arid subtropical. Veruga zone. Town on the main railroad line from Lima to Oroya. Matucana is about 64 miles from Lima in the Rimac valley. The hillsides are very steep and rugged.

Maraynioc. Practically no description of Maraynioc and the surrounding country has ever been published. Therefore, I shall try to set down a few facts that might be of interest and help to future collectors.

Maraynioc is not a village or district but a private hacienda or ranch whose boundaries cover a considerable area. Maraynioc is located in the Eastern Cordillera, some twenty miles north-east of Tarma, the capitol of the Department of Junín. It is clearly marked on the large government road maps issued by the Ministerio de Fomento, but spelled "Marainioc." The small ranch house and old sheep barn are situated on the banks near the headwaters of the Rio Anamayo at an altitude of 12,000 feet, in the humid temperate zone.

Maraynioc can easily be reached from Lima in a day and a half by taking a train to Oroya, a distance of 222 miles (eight hours). From Oroya to Tarma by small modern public bus, a distance of 28 miles (two hours). From Tarma a second bus can be taken to the village of Palca, the nearest point to the Hacienda and twelve miles from Tarma, or one hour's drive. Arriving in Palca it is then only a matter of trying to persuade somebody to take you by truck over a hair-raising, slippery, mountainous road to Maraynioc, a four hour drive under the best conditions. The same trip from Palca to the ranch can also be covered by mule or horse, if procurable, in the same length of time. The trip, however, if the weather is suitable, is best done by private car or truck hired in Tarma.

Hacienda Maraynioc is the residue of a grand and glorious venture which failed utterly. Many years ago a small group of men got together and spent thousands of dollars putting a road into the hacienda, building the U-shaped ranch house and a large galvanized tin sheep barn, erecting miles and miles of fencing in the rugged sierra country, and then importing thousands of sheep from Scotland. The climate proved much too damp for them and they rapidly died off, so that now hardly any of the original breed remain. The land is still owned by the son of one of the original partners, now living in Chile, and Maraynioc is administered for him by two Swiss gentlemen, Messrs. Maiback and Josi. The sole source of income now derived from the ranch is the weekly sale of excellent butter.

The first three months, March through May, I spent at Maraynioc

the weather could not have been worse. It rained almost every day and was very misty. The temperature ranged as low as 37° F. at night, to 75° when the sun shone. Towards the end of May the weather improved considerably.

Hacienda Maraynioc is situated in a narrow valley, some 35 miles long. The altitudes ranging from about 17,000 feet to about 2,000, with the corresponding differences in vegetation — there being nothing but very small bushes, grass and rocks at the higher elevations, small trees and bushes around the farm itself, and from 10,000 feet down an ever increasing sub-tropical and tropical jungle. Most of my collecting was done between 10,000 and 13,000 feet, although I was as high as 15,750 and down to 6,000 to a small branch of the Hacienda known as Chilpes. With this great range of altitude within a day's walk from the Hacienda, there is a great variety of birds. The mammal population between 11,000 feet and 15,000 feet was not abundant — there being several different kinds of rats and mice, a fair number of deer and skunks, a few opossum, bats, and rock chinchilla.

The headwaters of the Rio Anamayo, which is the swift mountain stream that flows by the Hacienda, runs from a series of small lakes (15,450 feet), some three hours walk above the ranch. The trail to Luchos follows the river for about a third of the way and then veers off, so that the confluence of the Anamayo with the Pariayacu, the trail is far above. There are no fish in the river, but a number of torrent ducks (Merganetta) were seen and collected, and dippers (Cinclus) were observed on three occasions.

Chilpes. 6,000 feet. Sub-tropical. A small branch of the Hacienda Maraynioc, where corn is grown for the natives and their livestock who live in the higher altitudes. It is situated some eleven miles, (three hours walking time, down hill), from Maraynioc, being connected by a narrow, rough, over-grown trail. The trail from Maraynioc to Luchos, forty minutes walking time, and from Luchos to the Pariayacu river (11,000 feet), ten minutes walking time, is fairly good, but from there on to Chilpes it remains uniformally bad, as there is almost a sudden change in the flora — the trees are larger, the undergrowth thicker and more abundant. The bird life also changes at this point so that anything collected beyond the Pariayacu river, in the direction of Chilpes, I labeled CHILPES.

Hunting along the Chilpes trail is most difficult, as the path follows along a mountain side and anything shot a little ways off is hard to retrieve, as it will either fall yards below or be completely concealed by the dense, nearly impenetrable underbrush.

Chilpes is but a clearing in the jungle where nothing but large fields of Indian corn predominate. In the opening is a small, four-roomed, tin roofed house where a native workman and his family live. Near the house is a small river which is hidden by trees where flocks of parrots, *Pionus tumultuosus*, feed when the trees are in fruit. Furnariidae of several species are abundant, and one Cock-of-the-Rock *Rupicola peruviana peruviana* was seen and collected.

Methods of Collecting

The three basic methods I used to collect birds were: shooting, trapping, and the use of Italian bird nets. The first method I shall not go into as it is too well known to experienced collectors, but the other two are hardly ever practiced by scientists in the field, and by their means very many interesting specimens are secured that cannot be gotten by shooting, and also long series of comparatively rare birds are sometimes procurable.

Trapping. Widely traveled collectors fully realize the efficiency and results achieved by the native snares in those countries where the natives are ingenious and rely on such methods for meat for the pot; but in the new world it is rare to find natives adept at trapping. Therefore, the gathering of zoological specimens falls back completely on the cleverness of the collector. The use of common steel traps, especially those of the under-spring variety, are extremely useful and efficient if you know how to use them.

While in Perú I used about a dozen No. 0 steel traps. By setting them on poles and rocks in advantageous localities, I was able to collect the following birds which were not secured in any other way.

Ciccaba albitarsus
Falco femoralis pichinchae
Accipter erythronemus ventralis

Placing the traps in trails on the ground I had the good fortune to catch four specimens of *Nothoprocta taczanowskii* and one specimen of *Grallaria s. squamigera.*

Bird Nets. For the last three years I have been using Italian bird nets on my trips. On this last expedition, they again showed their worth as a means of supplementing the collector's shotgun. Out of 302 birds collected, 125 were caught in the two nets set. This means that at least twice this number were caught, but only the desirable

ones were saved, and the rest released when possible. The following birds were caught only by means of the nets.

1. *Glaucidium jardinii jardinii*
2. *Veniliornis nigriceps pectoralis*
3. *Tyranniscus nigrocapillus nigrocapillus*
4. *Elaenia pallatangae*
5. *Elaenia albiceps modesta*
6. *Colibri iolatus iolatus*
7. *Diglossa baritula decorata*
8. *Delothraupis castaneiventris peruvianus*
9. *Hemispingus atro-pileus auricularis*
10. *Phrygilus unicolor inca*

CATALOGUE OF THE COLLECTION

By James L. Peters and J. A. Griswold, Jr.

In the following annotated catalogue of the collection the senior author is solely responsible for the identifications, nomenclature and taxonomy. The colors of the soft parts are quoted from the notes of the junior author. Field notes on status, habits and habitat are by the junior author.

The sequence of Orders and Families is that proposed by Wetmore (1934). The arrangement of genera and species, up to and including the Caprimulgidae, follows that of the first four volumes of Peters' Check-List (1931, 1934, 1937, 1940). The Trochilidae follow Simon (1921); in the remaining non-passerine families the order of genera and species is that used in the first two volumes of Cory's "Catalogue" (1918, 1919), while all the passerine groups have the genera and species arranged according to Hellmayr's continuation of Cory's Catalogue.

TINAMIDAE

Nothoprocta taczanowskii Sclater & Salvin

Marayniоc: 2 ♂, 2 ♀, 1 chick, 5 April–10 May, 12000 ft.
"Eyes chestnut; culmen dark gray; legs yellow."

I have insufficient material to attempt to work out the relationships and ranges of the eight forms of Nothoprocta inhabiting the high mountains of Peru.

The wariness of these birds makes them very difficult to shoot, although they were fairly common. In fact, during all the time I was

at Maraynioc, I never succeeded in shooting a single specimen, and it was not until I had learned a little about their habits that I was able to collect the four specimens I brought back with me. This tinamou lives in the small copses and on the grassy slopes, and is most frequently seen around the small potato patches, that are scattered around the country side. It was through their weakness for potatoes that I was finally able to trap four. These tinamous run very rapidly whenever there is much cover, but if surprised in the open will usually sit until almost stepped on, then rise with a cackle and a whir of wings.

The method I used for catching tinamous was to place traps in their runways, where they were in the habit of entering a potato patch, and then block off the intervening spaces between the traps with brush. Fresh, partly eaten potatoes and the accompanying scratches of newly dug-up earth were a sure indication that tinamous were frequenting a potato field. A potato field bordering or almost surrounded by brush and trees was the most productive.

April and May, the beginning of summer, must be the nesting season as partly formed eggs were found in the oviducts of two specimens, one on the 5th of April, the other on the 10th of May.

COLYMBIDAE

Colymbus occipitalis juninensis (Berlepsch and Stolzmann)

Maraynioc: 1 ♂, 31 March, 1939.
"Eyes red; bill gray; legs black."

Berlepsch and Stolzmann (1894, p. 109, pl. 4) described *Podiceps taczanowskii* from Lake Junín based on 3♂, 3♀ taken 24 and 27 May by Ladislas Taczanowski. In the original description these birds were compared with a single adult (sex and season not stated) of *Podiceps calipareus* (Lesson) [=*occipitalis*] from the Straits of Magellan and were found to differ in having a longer and broader bill, larger nasal openings set in a longer and deeper groove; both mandibles tipped with whitish; tarsi and toes longer and stouter; auricular plumes "silky cinereous brown" instead of "golden straw-color"; front of head including the upper part of the cheeks dark cinereous instead of pale brownish gray; black of nuchal region blending into the color of the occiput instead of being sharply separated from it, the black of the nuchal region in *taczanowskii* descending farther down on the back of the neck; cheeks and throat pure white instead of pale brownish gray;

outerwebs of secondaries mostly white, more or less freckled with ashy gray.

In the same article Berlepsch and Stolzmann go on to mention three additional specimens in the University Museum at Warsaw, collected by Jelski at Lake Junin 16 August, 1872. These were examined by Stolzmann who pronounced one to be *taczanowski*, the other two were found to have the shorter bill of *occipitalis*, though differing in color from that form just as did *taczanowskii*. For the two latter birds they proposed the name *Podiceps calliparaeus juninensis*.

In identifying Griswold's specimen I have available for comparison 2♂, 2♀, of *C. o. occipitalis* from Patagonia, killed in December; of *C. o. juninensis*, 1♀ and 1 not sexed from Lake Titicaca, Peru, taken in August and Jan.-Feb. respectively; 2♀ from Lake Pariguana, Peru, 13,500 feet, 3 December, and 1♀, Mt. Antisana, 13,200 feet, Ecuador, shot in October.

The Patagonian birds, all taken at end of the breeding season, are surely of the typical race with restricted black occipital patch of the head; auricular plumes straw-color (except in one ♀ that I judge to be sub-adult); cheeks and throat pale smoky; outer secondaries white on both webs with varying amounts of freckling. They measure:

	Wing	*Bill*	*Tarsus*	*Wing Bill Index*
M. C. Z. 85103 ♂	122.5	16.4	42	74
85102 ♂	123.5	19.8	43.5	62
85105 ♀	124.2	17.6	41.1	70
85104 ♀ (sub adult)	123.7	17.	41.7	72

The measurements of the specimen of this form available to Berlepsch and Stolzman as given by them are:

sex —	128	18.25	41.	70

The skins that I refer to *C. o. juninensis* measure as follows:

	Wing	*Bill*	*Tarsus*	*Wing Bill Index*
M. C. Z. 24307 Peru: Lake Titicaca	120.3	16.3	37.1	74
82917 " " ♀	118.3	14.8	37	79
269628 " Lake Pariguana ♀	127	17.5	38.8	72
269629 " Lake Pariguana ♀ (= ♂ ?)	132.3	18.7	41.7	70
199023 Ecuador: Antisana ♀	122.7	17.2	38.4	71

The throat and cheeks are clearly white. All agree with the color characters given for *juninensis.*

The Griswold specimen has the color of the top of head and neck and of the auricular tufts as described in *taczanowskii* and *juninensis,* but the cheeks and throat are pale smoky gray, not white; in the dried skin the bill has the basal two thirds black and the tip grayish as described for *taczanowskii.* It measures:

M. C. Z. 266548 ♂	125.5	21.4	42.7	58

The measurements of *taczanowskii* given by Berlepsch and Stolzmann are:

3 ♂	122–129	32–33	44.5–45
3 ♀	115.5–124	28.75–29	42.5–44.5

A pair of *taczanowskii* from Lake Junin, loaned me by the American Museum of Natural History measure:

♂	119.4	29.6	41.7	40
♀	—	27.1	43.4	

I have been much puzzled by Mr. Griswold's bird, but finally refer it to *juninensis;* it is true that the pale smoky gray throat and sides of head are difficult to account for except on the basis of imperfect knowledge of this grebe's plumage sequences, but it is definitely not *taczanowskii;* the latter bird has a larger body, longer bill and stouter feet, but its wing is little longer than that of *juninensis.* A "wing-bill" index $\left(\frac{\text{wing length}}{\text{bill length}}\right)$ gives .62–.74 for *o. occipitalis,* .70–.79 for *juninensis,* .58 for Griswold's bird (♂) and .40 for *taczanowskii* ♂.

The three or four grebes that I observed on the high mountain lakes, some five hours walk above the hacienda, never flew to escape, but swam or dived out of shotgun range.

ANATIDAE

Merganetta armata leucogenis (Tschudi)

Maraynioc: 1 ♂, 2 ♀, 10 April–17 May 1939.
"Eyes dark brown; bill red; legs red."

This torrent duck was not uncommon in the stream that ran by the hacienda. They were more apt to be seen on cloudy or rainy days than at other times. This was probably due to the swelling of the river, which became a real torrent. Although not uncommon, they were very

hard to collect, being very shy birds, excellent swimmers and divers. They were usually seen sitting on rocks in the middle of the stream, and when approached would hop into the water and swim rapidly down stream, the speed of the current carrying them quickly out of range. If pressed too closely they will either dive, swimming down stream or up, or take to their wings, being excellent fliers.

CATHARTIDAE

Coragyps atratus (Bechstein)

Lima (San Isidro): 1 ♀. 22 February 1939.

Friedman (1933, p. 187–188), the most recent reviser of Coragyps recognizes no races of this bird throughout its wide range. His measurements (not segregated by sexes) show the North American series as having a wing length ranging between 415 and 454 mm. and the wing of the South American birds varying from 405–432 mm. While admitting the average smaller size of the South American Black Vulture, Friedmann shows that this average is less than 3% of their size and that only the very largest of the North American birds can be distinguished with certainty. While it is a pity that Friedmann's measurements show neither the sex nor the country whence his specimens came, nevertheless they prove that on the basis of his material the recognition of a South American race of this bird is not justified. I have measured seven South American birds (only two of them sexed) and secure the following results:

1 ♀ Saboga Id., Bay of Panama	wing 405
1 ♀ Lima, Peru	385
1 — Surinam	395
2 — Brazil	390, 400
2 — Chile	400, 405
5 ♂ Southeastern United States	395–430
5 ♀ Southeastern United States	415–430

On the basis of the material examined by me the recognition of *foetens* is justified but partly in view of the widely scattered places whence skins are available and that I have seen no topotypical *foetens* from Paraguay, it seems best to refrain from recognizing any races of *Coragyps atratus*. The truth of the matter is that neither Friedmann nor I have examined a sufficiently representative properly sexed series.

Cathartes aura jota (Molina)

Maraynioc: 2 ♂, 10 and 24 June 1939, 12,000 feet.
"Eyes brown; face pink; bill white; legs whitish-yellow."
Wings 520, 530.

Turkey Vultures did not appear at Maraynioc until the first week of May, just as the dry season was starting. At first only one or two, increasing gradually as the weather improved. They would usually follow definite routes, passing a definite spot every time, unless frightened. One specimen weighed 3¾ pounds.

ACCIPITRIDAE

Accipiter erythronemius ventralis Sclater

Maraynioc: 2 ♂, 1 ♀, 3–10 May 1939.
"Eyes orange or orange yellow; eye ring yellow; bill blue horn; cere yellow; legs yellow."

The small Accipiters of Colombia, Venezuela, Ecuador and Peru are a very variable lot and without knowing the origin of any given specimen, subspecific determination would hardly be possible. In series, *A. e. salvini* of the Santa Marta Mts. and the Andes of Mérida averages paler gray above, but the underparts vary from uniform reddish brown in some males to pure white in some females.

A male *A. e. ventralis* from near Bogotá, Colombia has the reddish brown confined to the tibiae, the rest of the underparts being washed with gray and with obsolete bars of grayish brown from the lower border of the throat back to the belly; the flanks are pale rusty; one of Griswold's males is pure white below except for the tibiae and faint rusty barring on the flanks and sides of chest; the other is strongly suffused with reddish brown over the entire underparts with an underlying grayish wash on the chest and distinct dusky bars on the middle of the underparts, the flanks and tibiae being uniform deep reddish brown.

This little hawk was fairly common, but only one specimen was shot, and that on the wing. The other two specimens were caught by means of traps on high poles. The remains of a bird were found in the crop of one specimen.

Buteo polyosoma poecilochrous Gurney

Maraynioc: 1 [im.] ♂, 12 April 1939, 12,000 feet.
"Eyes fawn; bill blue horn; legs yellow."
Wing 408; tail 250 mm; wing tail index 60.

This is a rather puzzling specimen; its 3d and 5th primaries being equal and the large wing-tail index place it as *poecilochrous* as defined by Stresemann (1925, p. 316–317). The table of measurements given by Stresemann does not include any dimensions for immature males. Chapman (1926, p. 229–230) feels that the primary formula is inconstant and that our knowledge of the relationships of *poecilochrous* and *polyosoma* is far from satisfactory. Chapman had but five specimens available to him with the *poecilochrous* primary formula and none of those that had the sex determined were immature. His adult males had wings ranging from 418–438 and tails from 223–243.

Weight 1¾ pounds. Stomach contents, 3 lizards and the remains of a mouse.

FALCONIDAE

Phalcoboenus megalopterus megalopterus (Meyen)

Maraynioc: 1 ♂, 1 ♀. 28 March and 3 May, 1939. 12000–13000 feet.
"Eyes brown; bill blue-horn; soft parts orange; legs yellow."

Phalcoboenus was very common, being observed daily in small groups or pairs. They are excellent fliers and would often play follow-the-leader, chasing each other around and around a given point. It was a common sight to see them walking around on the ground looking for food. The crop and stomach contents of the two specimens shot contained grasshoppers and other insects, lizards, cocoons and caterpillars. The body weight of the male was 1¾ pounds.

Falco femoralis pichinchae Chapman

Maraynioc: 1 ♀. 19 March, 1939. 13000 feet.
"Eyes dark brown; bill blue-horn; cere yellow; soft parts yellow."
Wing 305 mm.

Variation in the Aplomado Falcon has been discussed by Todd and Carriker (1922, p. 160–162) and by Chapman (1925, p. 1–2). The studies of these two ornithologists show that the species is divisible into three races, the distinctions resting mainly on (a) size and (b) the character of the black abdominal patch. Thus there are two forms with a black patch extending completely across the abdomen, a larger North American race *septentrionalis* Todd, and a smaller South American form, typical *femoralis* Temminck. The third race, found in the Andes of Ecuador and Peru (*pichinchae* Chapman) is characterized by large size and a divided abdominal patch. Swann and Wetmore (1936, p.

424–427) recognize an additional race in southern South America, *fuscocaerulescens* Vieillot, characterized by moderately large size and duller coloration.

I have prepared the following table of wing measurements based on specimens in the M. C. Z., to which are added some measurements which I took on the U. S. National Museum material of this species some years ago, and the measurements published by Todd and by Chapman in their papers already referred to.

Much more recently Wetmore (1939, p. 187–188) has discussed the subject further and published additional measurements.

Wing Measurements — *Falco femoralis*

		♂	♀
United States	Arizona	245	290
	Texas	255	289
		258	291
		259	293
		260	295
		263	305
Mexico	Sinaloa	250	290
	Tamaulipas	250	292
		253	
		255	
	Vera Cruz	242	281
		250	
		255	
British Honduras		240	
Colombia		220	265
		230	270
		238	271
		241	
Venezuela		237	
Brazil	Para	228	
	Matto Grosso		258
			259
			263
Bolivia		240	262
		240	267
		248	
Paraguay		239	267
Chile		254	280
		260	286
Argentina	Salta		251
	Chaco		273

		♂	♀
	Formosa	235	
	Santa Fe	234	
	Buenos Aires		283
	Tucumán	231	280
		235	269
		259	
	Córdoba	254	277
	Chubut	238	251
		240	284
Peru		270	299
			300
Ecuador		295	205
		295	210
		290	

From the measurements given in the table it is evident that some of the birds from Chile and southern and western Argentina are larger than the birds from the rest of tropical South America; they appear browner and darker than the North American *F. f. septentrionalis,* but since both large and small birds occur in the same general regions, the possibility that North American migrants are involved as suggested by Wetmore cannot be ignored. More material is necessary to decide the question.

Falco fuscocaerulescens Vieillot (Nouv. Dict. Hist. Nat., **11**, 1817, p. 90 — Paraguay; based on the 'obscuro azulejo' of Azara, (Apuntes **1**, 1802, p. 179, No. XL) has for many years been considered applicable to this species and was also the specific name. Careful reading of Azara's account, the sole basis of Vieillot's name, convinces me that *Falco fuscocaerulescens* Vieillot 1817 applies to *Falco albigularis* Daudin 1802. Sufficient material is not available for me to decide whether Vieillot's name might be applicable to the bird described as *Falco albigularis pax* Chubb 1918.

But, in any event, *fuscocaerulescens* can no longer be used for the Aplomado Falcon, and in its place it is necessary to revert to *Falco femoralis* Temminck (Pl. col., livr. 58, pl, 121, livr. 21, pl. 343, 1822, — Brazil, *ex* Natterer).

CRACIDAE

Penelope montagnii plumosa Berlepsch and Stolzmann

Chilpes: 3 ♂, 30 May–17 June, 1939. 9000–10000 feet.
"Eyes red; throat red; bill very dark brown; legs red."

These three birds are virtual topotypes of the subspecies originally described from Maraynioc. The posterior underparts are more noticeably reddish brown than in any of the other races of *P. montagnii;* in fact, one specimen is so strongly suffused with this color as to suggest a tendency toward erythrism.

This guan was common; it was found as high as 10,000 feet. The nature of the terrain made it impossible to shoot this bird except along the trail between Pariayacu and Chilpes. The weight of a specimen taken 14 June was 1¼ lbs.

CHARADRIIDAE

Ptiloscelys resplendens (Tschudi)

Maraynioc: 1 ♂, 2 ♀. 21–25 May, 1939. 12,000 feet.
"Eyes and legs wine-red; bill wine-red; tip black."

Seen daily after the middle of May, and usually in pairs. This spur-winged plover has a cry not unlike a gull and frequents open grassy meadows. It was usually seen in the damp fields near the hacienda, at an altitude of 12,000 feet. Generally it was quite shy, but one pair became very curious when a dog tried to chase them.

COLUMBIDAE

Metriopelia ceciliae ceciliae (Lesson)

Callahuanca (67 km. northeast of Lima): 22 April, 1939. 5200 feet.
"Eyes blue; eye ring orange; bill dark gray; legs flesh color."

Extremely common on the arid mountain slopes at Callahuanca.

Oreopeleia bourcieri frenata (Tschudi)

Chilpes: 1 ♂. 19 June, 1939. 11,000 feet.
"Eyes black center, yellow ring; bill black; legs pinkish red."

This specimen is not fully adult; barred and vermiculated feathers of the juvenal plumage are scattered throughout the various tracts.

Noted on several occasions between the altitudes of 9,000 and 11,000 feet. An inhabitant of the thick underbrush, where it is usually seen running along the trails. It is only comparatively timid.

PSITTACIDAE

Hapalopsittaca melanotis peruviana (Carriker)

Chilpes: 1 ♂. 1 June, 1938. 9,000 feet.
"Eyes brown; eye ring orange-red; bill light blue horn; legs light blue gray."

This well-marked race was recently described by Carriker from a pair shot together at Auquimarca, 10,000 feet, Paucartambo River, Department of Junín, Peru, and at the time constituted the first Peruvian record for the species. So far as I am aware, Griswold's specimen now constitutes the third record, and extends the range of *peruviana* about 60 km in a southerly direction.

Comparing the Chilpes specimen with the cotypes of *H. m. melanotis* (Lafr.) I find it to differ in precisely the characters pointed out by Carriker, and the race is unquestionably valid.

Pionus tumultuosus (Tschudi)

Chilpes: 1 ♂. 2 April, 1939. 6,000 feet.
"Eyes brown; bill ivory; legs gray."

Very common and fairly tame when feeding in large groups.

[*Bolborhynchus andicola* (Finsch)

Although no specimens of this little parrot were collected, they were observed on several occasions feeding on wild blackberries. These parrots do not start to arrive at Maraynioc till about the middle of June, when it really starts to get warmer and the rains let up.]

STRIGIDAE

Glaucidium jardinii jardinii (Bonaparte)

Maraynioc: 1 ♂, 1 ♀, 19 and 22 March, 1939. 12,000 feet.
"Eyes yellow; bill olive; feet olive."

The male is in the red phase. The differences between Peruvian specimens and immature birds from Ecuador pointed out by Berlepsch and Stolzmann disappear when adults from the two countries are compared.

G. jardinii is structurally very near *G. brasilianum*, and as Chapman (1929, p. 8) has already suggested, it is not unlikely that the two are zonal representatives. *G. brasilianum* in various geographic races, for the most part inhabits the less heavily forested areas in the tropical

zone of Central and South America (extending also into southern Arizona) with subtropical zone races as well, described from Mt. Duida and the Andes of Tucumán.

These two little owls were caught alive on two consecutive days, in a bird net. The stomach contents of the female contained grasshopper heads.

GLAUCIDIUM BRASILIANUM BRASILIANUM (Gmelin)

Chosica: 1 ♀. 2 July, 1939. 2,500 feet.
"Eyes yellow; bill and feet olive."

This bird from the tropical zone about twenty-five miles north of Lima does not appear distinguishable from the typical race. This was also the result of Chapman's study of this bird (1929, p. 9–10) and Zimmer's (1930, p. 265–266) conclusions.

SPEOTYTO CUNICULARIA NANODES Berlepsch and Stolzmann

Cajamarquilla (24 km. northeast of Lima): 1 ad. ♂, 1 juv. ♀, 1 ad. ♀. 25 February and 22 April, 1939. 1,500–1,200 feet.
"Eyes yellow; bill greenish brown; legs greenish brown."

Very common in the arid tropical zone, where it frequents the old Inca ruins, and the earthen walls along the roads. A pair was noted in a vacant lot in the actual city of Lima.

CICCABA ALBITARSUS OPACA Peters subsp. nov.

Maraynioc: 3 ♀. 30 April–31 May, 1939. 12,000 feet.
"Eyes black; bill yellow; feet yellow."

Type. M. C. Z. No. 266577, adult female, collected at Maraynioc, Department of Junín, Peru, 12,000 feet, 31 May, 1939 by J. A. Griswold, Jr.

Characters. Similar to *C. a. albitarsus* Bonaparte (type locality Bogotá, Colombia) but upper parts with dark markings more extensive and nearly black instead of brown; the light markings more brownish, less rufescent, and correspondingly reduced; below with a greater admixture of white, general ground color less rufescent, the brown bars darker and more sharply contrasted. Size smaller.

Measurements.

Venezuela	3 ♀		wing: 260, 265, 275
Colombia	3	(not sexed)	260, 270, 273
Ecuador	1 ♀	(in moult)	252
Peru	3 ♀		240, 245, 253

This proposed new form fits the description of *C. a. goodfellowi* Chubb (type locality, north of Quito, Ecuador) in many details; in fact, were it not for Chapman's comment that even with a Mt. Pichincha specimen before him he was unable to detect the characters attributed to *goodfellowi*, I should be inclined to assign that name to it. However, since the type of *goodfellowi* is in the British Museum, where it is at present inaccessible, Chapman's action may as well be the deciding factor, and Chubb's proposed Ecuadorean race relegated to synonymy.

Ciccaba albitarsus has a more extensive range than supposed; previously recorded only from the temperate zone of the Andes of Venezuela, Colombia and Ecuador, Griswold's birds extend the range to central Peru and Mr. Todd expects shortly to describe an additional race from northern Bolivia.

Even though four specimens of this owl were collected, I never saw one flying. They were all caught with steel traps set on high posts, commanding a good view of the countryside. One specimen, kept for several months, thrived on a diet of birds and mice.

CUCULIDAE

Crotophaga sulcirostris casassi Lesson

Santa Eulalia (47 km. northwest of Lima): 1 ♂, 25 February, 1939. 3,500 feet. "Bill and legs black."

Birds from the coast of Peru have slenderer bills with less arched culmens than topotypical material from Mexico; there appear to be no other constant differences. Bill measurements follow:

	Length of Bill	*Height*
Four males, coast of Peru	24.9	15
	24.9	16.2
	27	16.9
	25	14.8
Three females	23.8	14.1
	25.2	15.1
	23.5	14.4
Five, both sexes, Mexico	29.6	19.5
	27.6	17.8
	27.2	18.5
	25.8	16.9
	29.8	19.6

The name *Crotophaga casassi* Lesson (Man. d'Orn., **2**, 1828, p. 134) based on examples from Lima is available for this small-billed Peruvian race. I have seen no other South American material except a male from Santa Marta, Colombia; this is a large-billed bird.

CAPRIMULGIDAE

CAPRIMULGUS LONGIROSTRIS ATRIPUNCTATUS (Chapman)

Maraynioc: 1 ad. ♂, 3 subad. or imm. ♂, 5 ad. and subad. ♀. 15 March–24 May, 1939. 12,000 feet.

A nice series that well bears out the characters originally attributed to it by the describer.

A female taken 30 April appears to be a male by plumage, but the label carries a sketch of the size of the ovaries and the word "positively" written above on the sex mark. The white spots on the primaries are smaller than in the male and have a light buffy wash around their edges, but the white blotches on the rectrices are characteristically male.

Very common in the pastures around the hacienda, and were easily collected with a headlight.

TROCHILIDAE

COLIBRI IOLATUS IOLATUS (Gould)

Maraynioc: 1 imm. ♀. 18 May, 1939. 12,000 feet.
"Eyes dark brown; bill and legs black."

OREOTROCHILUS MELANOGASTER Gould

Maraynioc: 1 imm. ♂. 21 June, 1939. 15,500 feet.
"Eyes brown; bill and legs black."

Simon created the genus Gnaphocercus in which he included *Oreotrochilus adela* (d'Orb. and Lafr.) (type) and *O. melanogaster*. The two are specifically distinct, but the latter species belongs in Oreotrochilus *sensu strictu*. With the exception of *adela*, it would probably not be incorrect to regard all the Oreotrochili as belonging to a single Formenkreis; certainly all are representative, though sometimes distinguished on color characters that would appear specific. In northwestern Argentina there is a certain amount of mingling of *leucopleurus* and *estella*, but where these occur together it is not improbable that it is

the result of altitudinal migration and that the two have distinct breeding ranges.

PATAGONA GIGAS PERUVIANA Boucard

Matucana (74 km. northeast of Lima): 1. 28 February, 1939. 8,000 feet.
"Bill and legs black."
Wing 131.8; bill 39.5.

AGLAEACTIS CUPRIPENNIS CAUMATONOTA (Gould)

Maraynioc: 3♂, 1♀. 9 March–12 May, 1939. 12,000 feet.
"Eyes brown; bill and legs black."

This form is clearly a subspecies of *A. cupripennis* of which it is a saturate southern representative. The center of distribution of this attractive genus is in the temperate zone of the mountains of northern and central Peru, where five of the seven known forms are recorded.

Typical *cupripennis* enjoys a rather wide range in the Andes of Colombia and northern and central Ecuador. *A. c. parvula* is a somewhat more richly colored race recorded from southern Ecuador and northern Peru in Departments of Cajamarca and Amazonas. Carriker has recently named (1935, p. 7) *A. c. ruficauda* which he believes inhabits the western slopes of the eastern Cordillera of northern Peru from Cajamarquillo to Patas; this form is said to be similar to *parvula*, but differs from it (as well as from *cupripennis* and *caumatonota*) in having the tail almost wholly cinnamon rufous. *A. c. caumatonota* is at present known from the departments of Junín (Maraynioc and Pariayacu), Ayacucho (Ayacucho and Matara) and Cuzco (Cachupata, type locality).

Aglaeactis aliciae Salvin is currently regarded as a distinct species, but should almost certainly be included in the *cupripennis* Formenkreis; it is really a counterpart of *caumatonota*, but with the rufous coloration replaced with white. Thus the general appearance of *aliciae* is dark brownish black with white markings. *A. aliciae* appears to be restricted to the departments of Libertad and Ancash where it is recorded from Huamachuco and Succha respectively.

Aglaeactis castelnaudii (Bourcier and Mulsant) cannot be considered a race of *cupripennis* since it occurs together with *caumatonota* at least over a part of the range of the latter; the center of abundance of *castelnaudii* appears to be in the Department of Cuzco whence it is known from Cuchupata, the mountains above Cuzco and from above Ollantaytambo; Taczanowski (1884, 1, p. 344) records it from Acan-

cocha, Junín, while Zimmer (1930, p. 281) took it from the mountains near Húanuco in the Department of Húanuco. It is quite likely that *castelnaudii* is the northern race of *Aglaeactis pamela* (d'Orb. and Lafr.) of the Andes of Bolivia, though I have not examined sufficient material of either to support such a supposition.

Very common around the altitude of 12,000 feet. It appears to nest during the rainy season.

Lafresnaya lafresnayi rectirostris (Berlepsch and Stolzmann)

Maraynioc: 5 ad. ♂, 8 imm. ♂, 6 ♀. 6 March–20 May, 1939. All at 12,000 feet.
"Eyes brown; bill and legs black."

Zimmer (1930, p. 281–282) points out certain color characters for distinguishing this race from the Ecuadorian form (*saul*), but comparing the five adult male topotypes of *rectirostris* with an equal number of Ecuadorian adult males these differences are not apparent. The wing and bill measurements of the same birds are:

saul	wing:	61.3, 61.6, 61.9, 60.4, 60.1
	bill:	25.6, 25.5, 24.6, 24.1, 26.0
rectirostris	wing:	63.4, 62.9, 64.7, 63.5, 64.2
	bill:	23.6, 24.1, 24.6, 24.0, 24.2

This table upholds the size character for *rectirostris* given by Zimmer, *i. e.*, longer wing and shorter bill.

The commonest of all the humming birds in the vicinity of Maraynioc. It is certain that this humming bird nests during the cold, rainy season, as females did not become common until the middle of May.

Pterophanes cyanopterus peruvianus Boucard

Maraynioc: 2 ad. ♂, 1 imm. ♂, 2 ♀. 18 March–20 May, 1939. 12,000 feet.
"Eyes and bill black; legs flesh-color." (adults)
"Eyes brown; bill black; legs red." (immature)

For comparison I have available an immature male from "Bogotá" (topotype), five adult males from Ecuador, two adult males from the Rio Marcapata, and one adult male from Bolivia (no females). The immature Maraynioc bird has a greater extent of grayish white on the outer pair of rectrices than the Bogotá bird, but the value of this character requires substantiation. All four Peruvian males and the Bolivian male are alike, and differ from the five Ecuadorian males in

being noticeably darker above, especially on back and head where the green has a blackish wash.

The bill and wing measurements of the ten adult males compared are:

cyanopterus	wing:	106.6,	111.3,	107.1,	106.3,	107.4
	bill:	29.1,	27.4,		29.5,	29.8, 29.5
		Maraynioc		Rio Marcapata		Bolivia
peruvianus	wing:	119.3,	114.6	116.4,	——	111.8
	bill:	29.8,	31.0	29.5,	30.7	30.8

While this form has not been currently recognized, it certainly appears distinguishable, both on size and color characters, as pointed out in the original description.

Fairly common around 12,000 feet. One pair was seen courting on March 26.

Ensifera ensifera (Boissoneau)

Maraynioc: 2 ♂, 8 April and 10 May, 1939. 12,000 feet.
"Eyes and bill black; legs pink."

With adequate material from all parts of the range it may ultimately prove possible to sub-divide this species into one or more additional races.

Comparatively rare. Two specimens out of three seen were feeding on a long red tubular flower, for which their bills were admirably suited.

Helianthea violifer dichroura Taczanowski

Maraynioc: 6 ♂. 8 March–14 June, 1939. 11,000–12,000 feet.
"Eyes dark brown; bill black; legs flesh-color."

This race was originally described from Maraynioc. Simon created the name Pseudodiphlogoena for a section of the genus Helianthea in which he placed *H. violifer* and allied forms, *i.e. dichroura, osculans* and *eos*, but in my opinion this subgeneric split is unnecessary.

The specific name *violifer* is a "made up" Latin word; whether it should be altered to *violifera* if associated with a feminine genus depends on whether it is considered an adjective meaning "violet bearing," in which case such alteration is permissible, or whether it is a substantive meaning "a bearer of violet," in which case the original form is to be retained.

Not one female was seen, of this otherwise common hummingbird.

Heliangelus amethysticollis laticlavius Salvin

Chilpes: 6 ♂, 4 ♀. 1–14 June, 1939. 9,000–10,000 feet.
"Eyes dark brown; bill and legs black."

The males of this series agree with the specimen from Huacapistana, Junín, referred to *H. laticlavius* by Carriker (Proc. Acad. Nat. Sci. Phila., **87**, 1935, p. 346–347) and all agree in a general way with Salvin's characterization of this race. Salvin compared *laticlavius* with *clarissae*, stating that the upper surface and tail of both were colored the same way, but that the former had a pectoral band twice as wide as in the allied form; no band of glittering green feathers below the white pectoral band; middle of the abdomen more distinctly buff and the under tail coverts white with wider dusky shaft stripes. The types of *laticlavius* came from Jima and Intac, Ecuador, where they were collected by Buckley; a specimen from the "Rio Napo" was also referred to this race. Buckley's localities are open to serious question in many cases, and it is doubtful whether the same form occurs in the vicinity of Intac which is within the range of *strophianus*. Simon gives the range of *laticlavius* as southwestern Ecuador in the province of Cuenca. Comparing the plate of *laticlavius* (Cat. Bds. Brit. Mus., **16**, 1892, pl. 5) with the description shows some slight discrepancies; in the plate the lower border of the pectoral band has a buffy tinge, and the frontal plaque is larger than in *clarissae*. Both these features are present in the Peruvian birds examined, and in default of comparison with the actual types, they must bear the name *H. a. laticlavius*. Certainly they are not *amethysticollis*, of which I have four topotypical males from Bolivia (Acad. Nat. Sci. Phila. collection) before me; these birds have the entire pectoral band strongly suffused with buff and the abdomen largely of the same color.

A specimen from Cutucu, Oriente, Ecuador, is puzzling. The bird has a white pectoral band as wide as in *laticlavius;* there is a well developed frontal plaque which instead of being a glittering grass-green has blue reflections. It probably represents an undescribed race of *H. amethysticollis*, but its naming should await first, comparison with the type of *laticlavius* and second, more material from the same region.

Common along the trail from Pariayacu to Chilpes. This humming bird is confined to the jungle, not going above 10,000 feet.

Eriocnemis luciani sapphiropygia (Taczanowski)

Maraynioc: 6 ♂. 2 March–22 May, 1939. 12,000 feet.
"Eyes brown; bill and legs black."

This form should probably be treated as a race of *luciani* which is found in the temperate zone of Ecuador, chiefly on the western slopes of the Andes. *E. l. luciani* is characterized by a deeply forked tail, blue forehead and brilliant anterior underparts, becoming more bluish on the throat and less brilliantly green posteriorly. *E. l. sapphiropygia* (central Peru in departments of Junín and Cuzco) has a less deeply forked tail, forehead green or bronzy like the crown, and underparts uniform glittering green. In northern Peru (Leimebamba) *E. l. catherinae* occurs; like *luciani* the forehead is bluish, but the tail is forked as in *sapphiropygia;* the underparts are glittering green, becoming bluish in the center of the abdomen. *E. l. catherinae* is the connecting link between the two extremes, although the greenish blue abdomen is not found in either of the others. *E. l. luciani* has the undertail coverts shining blue, in *sapphiropygia* these have a violaceous tinge, in *catherinae* they are violet.

No female of this otherwise comparatively common hummingbird was seen or collected.

Metallura tyrianthina peruviana Boucard

Maraynioc: 1 ad. ♂, 6 imm. ♂. 22 March–17 May, 1939. 12,000 feet. "Eyes brown; bill and legs black."

Four males measure:	*wing*	*bill*
	56.9	11.7
	55.8	11.5
	56.6	11.6
	58.3	11.2
One male, Peru (Whiteley)	56.5	12.5
One female	51.2	11.5
smaragdinicollis (Bolivia)	♂ 57.5	12.7
	♀ 49.6	11.4
septentrionalis	♂ 61.7	11.7

A good series from different parts of Peru is necessary before the races of *M. tyrianthina* in that country can be cleared up. In 1893 Boucard described *M. peruviana* from "Peru," based on specimens collected by Whitely; it was said to be closely allied to *smaragdinicollis* but much larger (wing $2\frac{1}{4}'' = 56.6$ mm; bill $\frac{1}{2}'' = 12.5$ mm.), tail greenish above and more golden tinge on the underside. Six years later Hartert named *M. smaragdinicollis septentrionalis* with type collected by Baron at Huamachuco, northern Peru, stating that it was lighter green above and much paler below, showing a greater extent of the buffy subterminal color of the feathers; it was also claimed to be

slightly larger but no measurements were given. When describing *septentrionalis* Hartert claimed that Boucard re-described *smaragdinicollis* in naming *peruviana*. Simon synonymized *septentrionalis* (which he wrote *meridionalis*) with *peruviana*, but in the List of Types in the Tring Museum Hartert still upheld his race, stating that the type series was different from Whiteley's Peruvian series in having longer wings and darker coloration. From the preceding table it will be seen that the Maraynioc birds are of approximately the same size as Bolivian examples of *smaragdinicollis*, but a single male from Cayabamba is appreciably larger. On the other hand, the Maraynioc males differ from *smaragdinicollis* in having slightly darker green throats and deeper purplish tails; I therefore tentatively call them *peruviana*.

Hartert is of course correct in considering *smaragdinicollis* a subspecies of *tyrianthina*.

This is another common humming bird living at 12,000 feet, of which no female was ever seen.

Metallura eupogon

Maraynioc: 6 ♂, 4 ♀. 8 March–12 June, 1939. 12,000–12,500 feet.
"Eyes brown; bill and legs black."

Without ever having examined *baroni* and *atrigularis*, I should certainly not venture to reduce *eupogon* to a subspecies of *M. primolina*, but this will probably have to be done eventually.

Extremely common between the altitudes of 12,000 and 13,000 feet.

Chalcostigma stanleyi subsp.?

Maraynioc: 1 imm. ♀. 31 March, 1939. 14,000 feet.
"Eyes brown; bill and legs black."

It is not possible to tell whether or not this skin is referable to *C. s. versigularis* Zimmer; it should probably be that form on geographical grounds.

Chalcostigma olivaceum olivaceum (Lawrence)

Maraynioc: 1 ♂. 21 June, 1939. 15,500 feet.
"Eyes dark brown; bill black; legs dark gray."

This bird is not *C. o. pallens* Carriker which was described from La Galera on the western slopes of the Cordillera. I have no material of

either race with which to compare the color of the Maraynioc specimen, but its measurements definitely exclude *pallens* from consideration. Carriker's measurements for males of the two forms are:

C. o. olivaceum	3 ♂	wing:	89, 92, 92
		tail:	71, 70, 74
		bill:	16, 15, 14.5
C. o. pallens	1 ♂	wing:	74
		tail:	57
		bill:	13

The Maraynioc bird measures, wing, 90.8; tail 67.5; bill 13.1.

Humming birds at this high altitude (15,500 feet) are not so numerous as lower down, and are much shyer. They are very apt to alight, and also cling on the sides of rocks, there being only small shrubs at this altitude.

TROGONIDAE

Trogon personatus personatus Gould

Chilpes: 1 ♂, 1 ♀. 30 May and 1 June, 1939. 9,000 feet.
"Eyes dark brown; eye ring orange-red; bill yellow; legs dull yellow."

While Chapman (1926, p. 330) refers specimens from Chelpes [sic= Chilpes] to *personatus*, I cannot follow him in that respect to these two specimens; the ♂ is more like *assimilis;* the ♀ is intermediate between *assimilis* and *temperatus,* especially in the vermiculation of the wing coverts, which is just about in between the brown vermiculations of *personatus* and the black of *temperatus.* The Museum of Comparative Zoölogy has recently received in exchange with the Academy of Natural Science two trogons of this species from Bolivia; the ♂, taken at an elevation of 6,800 feet in the Yungas of La Paz is clearly *temperatus* having the white tail bars reduced to the barest indication; while the ♀ from 5,500 feet Dept. Santa Cruz (except for not being fully adult) is a very good match for the Chilpes ♀ and should, I think, be referred to *assimilis.* It seems quite likely that the *assimilis* type of bird is an intermediate, produced where the ranges of *personatus* and *temperatus* adjoin, though definite proof of this is lacking.

PICIDAE

Colaptes rupicola puna Cabanis

Maraynioc: 4 ♂, 2 ♀. 27 April–9 May, 1939. 12,500–13,000 feet.
"Eyes light yellow; bill dark gray; legs light green, greenish gray."

This race was first described by Cabanis in 1883 on two specimens from the Jauli Valley in Peru in the Berlin Museum, but many years before Lichtenstein had identified these two birds as "*Colaptes puna*" and had so listed them in the Nomenclator Avium published in 1854. Unfortunately, Lichtenstein's name was an absolute *nomen nudum* and it remained for Cabanis to publish the first diagnosis twenty-nine years later.

This flicker was common between 12,000 and 13,000 feet, and as far as I could tell, never went above or below these altitudes. They were usually quite localized, and could invariably be found day after day in the same little patch of woods. They were comparatively tame, and their distinctive call gave them away at once. They fed as much on the ground as they did in the trees.

Hypoxanthus rivolii brevirostris (Taczanowski)

Maraynioc: 1 ♀. 30 April, 1939. 12,000 feet.
"Eyes chestnut; bill black: legs gray."

This single specimen was the only one seen.

Veniliornis nigriceps pectoralis (Berlepsch and Stolzmann)

Maraynioc: 1 ♀. 9 May, 1939. 12,000 feet.
"Eyes reddish brown; bill dark blue-gray; legs dark greenish gray."
Wing 89.8; tail 57.9; bill 22.8.

A lone specimen caught in one of my bird nets was the only one seen.

Megapicos pollens peruviana (Cory)

Chilpes: 1 ♂, 1 ♀. 1 June, 1939. 9,000–11,000 feet.
"Eyes white (♂); light orange-pink (♀); bill black; legs gray."

This woodpecker was originally described from Molinopampa, Peru, on a single specimen, an adult female. Chapman (1926, p. 368–369) with three specimens from Rumicruz, Peru, pointed out that all the characters given in the original description did not hold good, but that *peruviana* was to be distinguished from typical *pollens* by the wholly ochraceous-tawny rump and back, and the large amount of this color in the interscapulars—a character well shown by the two Chilpes specimens.

Although these two specimens were collected on the same day, no others were ever again seen. Both birds were quite tame.

FURNARIIDAE

Cinclodes fuscus rivularis (Cabanis)

Maraynioc: 4 ♂, 2 ♀. 14 March–10 June, 1939. 12,000–15,000 feet.

Hellmayr (1925, p. 37) sinks *Cillurus rivularis* Cabanis in the synonymy of *C. f. albiventris* (Philippi and Landbeck), but Zimmer (1930, p. 340–341), with very long series available, finds it recognizable. My material is insufficient to form an independent opinion, but the Maraynioc birds are topotypical *rivularis*.

Very common from 12,000 to 15,000, where it frequented the open, barren Puna.

Schizoeca palpebralis Cabanis

Maraynioc: 1 ad. ♂, 1 imm. ♂, 1 ad. ♀, 1 imm. ♀. 31 March–22 June, 1939. 11,000–12,500 feet.

"Eyes brown; legs light blue-gray; bill black" (adult male and immature female); "upper mandible black, lower mandible light blue-gray" (adult female); "the immature male had brown eyes, olive legs, black upper mandible and yellow lower mandible."

Topotypes of the species, which so far is only known from Maraynioc where it was first secured by Jelski.

The immature birds lack the cinnamon rufous chin spot, have browner flanks and paler abdomens. The adult female has a white feather in the occiput.

Although this species was collected as high up as 12,500 feet, it is much more common at 11,000 and 10,000 feet. It is gregarious, going in little bands of about ten or fifteen. It is very tame and can be squeaked up within a few feet of the collector, but is always found in the very thickest undergrowth, and keeps on jumping around, so that it is difficult to shoot and still worse to find. When approached the whole group sets up a continual chirp, so that they always give themselves away.

Cranioleuca albicapilla albicapilla (Cabanis)

Maraynioc: 1 ad. ♂, 1 imm. ♂, 4 ♀. 8 March–11 June, 1939. 12,000–12,500 feet.

"Eyes light brown or chestnut (adults), brown. (immature); bill pink; legs olive."

A topotypical series of this very local species which appears to be known only from Maraynioc and Pariayacu in the Department of

Junín. Farther south in the Department of Cuzco it is replaced by *C. albicapilla albigula* Zimmer, a form that I have not seen.

A common bird between the altitudes of 12,000 and 12,500 feet. It is usually found in the little copses that grow at this elevation. One evening in the early part of June I found a large, round, moss-covered nest about a foot in diameter, and with a small hole in its underside, hanging from a branch some twenty feet from the ground. Throwing a stick at the nest I was surprised to see not one or two, but five of these *Cranioleucas*. The nest had no eggs in it, and was undoubtedly being used as a roosting place for the night.

Asthenes humilis humilis (Cabanis)

Maraynioc: 1 ♂, 1 ♀. 19 and 31 March, 1939. 14,000–14,500 feet.

These two skins are topotypical; compared with two skins from Cajamarca they bear out the validity of *A. h. cajamarcae* Zimmer (1936 A, p. 16).

Common in the higher altitudes, where it jumps around amongst the rocks. It was never seen below 13,500 feet.

Asthenes flammulata taczanowskii (Berlepsch and Stolzmann)

Maraynioc: 1 ♂. 6 May, 1939. 12,000 feet.
"Eyes brown; bill black; legs light brown."

A topotype of this well defined race. Carriker has named (Proc. Acad. Nat. Sci. Phila., **85**, 1933, p. 12) *A. f. pallida* from Quirivilca, on the western slopes of the Cordillera of Peru, in the Department of Libertad.

Margarornis squamigera peruviana Cory

Chilpes: 1 ♀. 14 June, 1939. 10,000 feet.
"Eyes dark brown; upper mandible brown; lower mandible white; legs brown."

Premnoplex brunnescens subsp.?

Chilpes: 1 juv. ♂. 1 June, 1939. 9,000 feet.
"Eyes dark brown; upper mandible black, lower mandible pink; legs dark brown."

Since the single specimen is in juvenile plumage it is not possible to refer it definitely either to *P. b. brunnescens* (Sclater) or to *P. b. stic-*

tonotus (Berlepsch). The former is recorded from Peru in departments of Loreto and Huanuco, the latter extends northward from Bolivia into the Department of Cuzco. Thus the Chilpes bird comes from an intermediate locality, and positive identification must rest on adults from this region.

Xenicopsoides montanus montanus (Tschudi)

Chilpes: 1 ♂. 31 May, 1939. 6,000 feet.
"Eyes dark brown; bill brown; legs olive."

This bird has a yellowish suffusion over the entire underparts, a feature not present in four other skins of this form from Cajamarca and Junín. However, the very small size of the gonads (as sketched on the label) indicates that the Chilpes bird is probably immature.

Thripadectes holostictus moderatus Zimmer

Chilpes: 1 ♂, 1 ♀. 30 and 31 May, 1939. 6,000 and 9,000 feet.
"Eyes dark brown; bill black; legs greenish brown."

Mr. J. T. Zimmer very kindly compared these two skins with the splendid material in the American Museum of Natural History; he writes, "Your specimens are certainly very close to *T. h. moderatus*. They have the same narrow streaks on the chest which distinguish that form from typical *holostictus* and differ from the remainder of the series in about the same amount that certain individuals of *holostictus* differ from the opposite extremes of that form. Your specimens are more olivaceous in color than any of my specimens of *moderatus* and possibly have a faintly deeper tone of rufous on the upper tail coverts. The dusky margins on throat feathers are at maximum development, but hardly more than shown by some of my birds. It is questionable whether a separate form could be maintained for the central Peruvian birds, although this is not impossible."

Xenops rutilans peruvianus Zimmer

Chilpes: 1 ♀. 31 May, 1939. 6,000 feet.
"Eyes dark brown; upper mandible brown; lower mandible flesh-color; legs very dark brown."

FORMICARIIDAE

Drymophila caudata peruviana Domeniewski and Stolzmann

Chilpes: 1 ♀. 31 May, 1939. 6,000 feet.
"Eyes gray; upper mandible very dark gray, lower mandible bluish white; legs bluish white."

In the absence of really adequate material of either this or the typical form, I am unable to form any independent opinion as to the validity of *peruviana;* it may prove quite inseparable from *c. caudata.*

Grallaria squamigera squamigera (Prévost and Des Murs)

Maraynioc: 1 ♀. 13 May, 1939. 12,000 feet.
"Eyes dark brown; bill black; legs light blue-gray."

The underparts of this bird are a clearer bluish gray than a skin from Colombia and another from Ecuador with which I have compared it, but the bird is obviously in very fresh, unworn plumage. It can hardly be referable to *canicauda* Chapman, even though it possesses a grayish rather than brown tail. Carriker (1935, p. 351) records birds from above Leymebamba and Bagazan that he refers to *canicauda,* but he also points out that *canicauda* in addition to having wings and tail concolorous with the back, has a pure white throat and a white subocular region. Perhaps the Maraynioc specimen could be identified as *G. s. squamigera* < *canicauda.*

This lone specimen was caught in a steel trap set for tinamou.

Grallaria andicola andicola (Cabanis)

Maraynioc: 2 ♂. 21 and 28 May, 1939. 12,500 feet.
"Eyes and bill very dark brown; legs light blue-gray."

Carriker (1932, p. 465–6) has shown that *Grallaria punensis* Chubb is but subspecifically distinct from *andicola.*

The silent and secretive ways of this bird made them difficult to collect. They were very apt to hop around the rocks and underbrush and disappear as if by magic.

Grallaria rufula obscura Berlepsch and Stolzmann

Maraynioc: 1 ♂. 26 March, 1939. 11,000 feet.
"Eyes dark brown; bill black; legs light blue-gray."

The race was originally based on a single female from Maraynioc.

Although this bird was fairly common around the vicinity of Pariayucu they were very timid. In the early morning and late evening they hopped around in the Chilpes trail, but at your approach would jump into the thick underbrush that bordered the trail. In the middle of the day they were never in evidence.

COTINGIDAE

Heliochera rubro-cristata (Lafresnaye and d'Orbigny)

Maraynioc: 3 ♂, 4 ♀. 6 March–20 May, 1939. 12,000 feet.
"Eyes red; bill blue-horn, tip black; legs dark gray."

These red-crested cotingas were common in the district known as Luchos, where they fed primarily on wild blackberries. A nest was found in March situated in low brush some seven feet from the ground. They were in the habit of taking up commanding positions at the very tops of the trees.

Euchlornis arcuata (Lafresnaye)

Chilpes: 2 ♂, 1 ♀. 17 and 19 June, 1939. 10,000 feet.
Maraynioc: 1 ♀. 1 April, 1939. 8,000 feet.
"Eyes white; bill red; legs orange."

One of the commonest birds along the Chilpes trail.

RUPICOLIDAE

Rupicola peruviana peruviana (Latham)

Chilpes: 1 ♂. 2 April, 1939. 6,000 feet.
"Eyes white; bill orange; legs lemon-yellow."

If Chapman's designation (1926, p. 547) of Chanchamayo, Department of Junín, is accepted, then this specimen must be called *peruviana*. It is difficult to reconcile Chapman's arbitrary designation of an almost impossible type locality with his published remarks of a year previous (1925) in which he rejects what he considers an unlikely restriction of type locality on the part of Brabourne and Chubb (for *Ara ambigua* Bechstein) and proposes to substitute a more probable one.

This single specimen was very tame, and was feeding some thirty feet from the ground in a wild fruit tree.

TYRANNIDAE

AGRIORNIS MONTANA INSOLENS Sclater and Salvin

Maraynioc: 1 ♀. 9 May, 1939. 12,000 feet.
"Eyes white; bill and legs black."

A bird in fresh plumage; the white edges on the feathers of the underparts are not worn off, giving the skin a paler appearance than is found in November killed specimens. There is a minimum of dark markings in the tail, the exposed parts of the four outer pair of rectrices being entirely white.

Only one specimen of this large, white-tailed flycatcher was seen.

MUSCISAXICOLA ALPINA GRISEA Taczanowski

Maraynioc: 1 ♂, 1 ♀. 31 March and 21 June, 1939. 14,000 feet.
"Eyes brown; legs and feet black."

These specimens are topotypical. The female (31 March) is completing what is probably a post-nuptial molt. The male is in fresh plumage; gonads minute; it is either an immature bird or perhaps a wintering individual from a higher altitude.

This flycatcher was never observed below 13,500 feet, but was not uncommon at the higher altitudes.

MUSCISAXICOLA ALBILORA Lafresnaye

Maraynioc: 3 ♂. 20–23 June 1939. 12,000 feet.
"Eyes brown; bill and legs black."

None of the three was breeding at the time of capture, the gonads were shrunken to minimum size. The birds doubtless represent winter visitants from the south.

There is still more intelligent collecting required before the interrelationships of *albilora*, *juninensis* and *tenuirostris* can be cleared up.

Around the middle of June this flycatcher appeared for the first time on the open grassy slopes near the hacienda. It is undoubtedly a winter visitor.

CNEMARCHUS ERYTHOPYGIUS BOLIVIANUS Carriker

Maraynioc: 2 ♂, 1 ♀. 16 March–6 June, 1939. 12,500–13,000 feet.
"Eyes brown; bill and legs black."

Not all the characters attributed to Bolivian birds in the original description are discernable in the three Maraynioc birds, but the

greater extent of white and paler grays of the head and chest certainly place it nearer to *bolivianus* than to typical *erythopygius*. Carriker records a specimen from above Leymebamba that is intermediate between the two races in the same respects as the Maraynioc birds.

This large, handsome flycatcher was not uncommon around 12,500 and 13,000 feet. It was usually seen in pairs, sitting on the highest branch of some small tree or bush. It is undoubtedly the shyest flycatcher I have ever come across, as it was very difficult to get within shotgun range. When pursued it would only fly a short way, but always alighting at a safe distance.

Cnemarchus rufipennis (Taczanowski)

Maraynioc: 1 ♀. 23 June, 1939. 12,500 feet.
"Pupil black, iris faun-color; bill and legs black."

One of a pair, and the only ones seen.

Ochthoeca fumicolor brunneifrons Berlepsch and Stolzmann

Maraynioc: 5 ♂, 1 ♀. 7 March–12 June, 1939. 11,000–12,500 feet.
"Eyes dark brown; bill and legs black."

Topotypical examples. The wings measure, male 83.8, 86.8, 89.5, 91, 92.3; female 80.1.

Common between 11,000 and 13,000 feet.

Ochthoeca rufi-pectoralis tectricialis Chapman

Maraynioc: 4 ♂, 1 ♀. 1 March–24 May, 1939. 12,000 feet.
"Eyes brown or dark brown; bill and legs black."

The commonest flycatcher at the altitude of 12,000 feet.

Ochthoeca cinnamomeiventris thoracica Taczanowski

Chilpes: 1 ♀. 30 May, 1939. 9,000 feet.
"Eyes dark brown; bill and legs black."

Taczanowski in first describing this form gave the type localities as Chilpes and Vitoc, but in the P. Z. S., 1896, p. 357, Berlepsch and Stolzmann state that the type is from Chilpes.

Hellmayr indicates that *thoracica* is probably a geographic race of *cinnamomeiventris*, which inhabits the subtropical zone of Colombia

and eastern Ecuador. I see no reason for not definitely regarding it as such.

Ochthoeca albidiadema orientalis Chapman

Chilpes: 1 ♀. 17 June, 1939. 10,000 feet.
"Eyes dark brown; bill black."

This is a rather puzzling specimen; in yellow lores, white supraocular spot and superciliaries and general coloration it is nearest to *orientalis*, but in the possession of traces of a rufous wing-bar and edgings of the inner secondaries it certainly constitutes an approach to the *pulchella-jelskii* complex.

Shot by being lured to a live owl (Ciccaba).

Pyrrhomyias cinnamomea cinnamomea (d'Orbigny and Lafresnaye)

Chilpes: 1 ♂. 1 April, 1939. 8,000 feet.
"Eyes brown; bill and legs black."

As Zimmer has already pointed out, the specimens of *P. cinnamomea* from central Peru are more or less intermediate between the typical form and *P. c. pyrrhoptera* (Hartl.); the Chilpes bird is like the type of *cinnamomea* and two recent skins from south-eastern Peru (Puno) in the possession of a less extensive rufous area across the rump.

Myiophobus ochraceiventris (Cabanis)

Chilpes: 1 ♂, 1 ♀. 14 June, 1939. 10,000 feet.
"Eyes brown; bill and legs black."

Identified from the description in Taczanowski's Orn. Pérou. Taczanowski described only the female and the immature male. The immature was named and described as *Myiobius subochraceus* by Sclater in P. Z. S., 1887, p. 50, and in the Cat. Bds. Brit. Mus., **14**, 1888, p. 208. It was not until 1921 that Chapman mentioned the "orange flame" crest, characteristic of the adult male.

There can be no doubt that both Sclater and Hellmayr are correct in removing this species from *Mitrephanes* in which genus it was placed by its original describer and subsequently carried by later authors. I am not so sure, however, that *Myiophobus* is its correct and ultimate repository; it might possibly be fitted into its proper place in some existing genus, or perhaps a new genus will have to be created for its reception; the latter course should be only a last resort.

Lophotriccus pileatus pileatus (Tschudi)

Chilpes: 1 ♀. 31 May, 1939. 6,000 feet.
"Iris flesh-color; bill black; legs dark gray."

Anairetes parulus aequatorialis (Berlepsch and Taczanowski)

Maraynioc: 1 ♂, 3 ♀.
"Iris light yellow; bill and legs black."

The generic name was originally spelled Anairetes by Reichenbach in 1850, and under the International Code is not preoccupied by Anaeretes De Jean, 1837; it is therefore not necessary to use Spizitornis Oberholser, 1920, which was proposed as a substitute for Anairetes.

This dainty little flycatcher presents a striking appearance with its cocky little crest and its light yellow eyes with dark centers. It was fairly common, and was usually seen in pairs in rather thick bushes. In two of the specimens shot, one had a spider in its bill, the other a small green caterpillar.

Mecocerculus leucophrys brunneomarginatus Chapman

Maraynioc: 1 ♂, 2 ♀. 25 May–11 June, 1939, 11,000–12,500 feet.
"Eyes dark brown; bill and legs black."

These birds measure:

Male	wing:	69.6	tail:	75.1
Female		63.6		71.8
"		67.0		69.0

They show no approach to *M. l. pallidior* Carriker; the smaller of the two females is in worn plumage, while the pair taken on 11 June is very fresh.

Mecocerculus stictopterus taeniopterus (Cabanis)

Chilpes: 1 ♀. 1 June, 1939. 9,000 feet.
"Eyes dark brown; upper mandible black, lower mandible flesh-color; legs gray."
Wing 61.2; tail 52.8.

Tyranniscus nigro-capillus nigro-capillus (Lafresnaye)

Maraynioc: 1 ♀. 19 May, 1939. 12,000 feet.
"Eyes dark brown; bill black; legs gray."

Elaenia albiceps modesta Tschudi

Maraynioc: 1 ♀. 25 May, 1939. 12,000 feet.
"Eyes dark brown; upper mandible black, lower mandible flesh-color; legs black."

Elaenia pallatangae Sclater

Maraynioc: 1 ♂. 2 May, 1939. 12,000 feet.
"Eyes brown; upper mandible dark brown; lower mandible flesh-color; legs black."

HIRUNDINIDAE

Atticora patagonica peruviana (Chapman)

Santa Eulalia (47 km. northeast of Lima): 1 ♀. 25 February, 1939. 3,500 feet.

For those who wish to split genera, this species may be placed in the genus Pygochelidon, but this seems to me an unnecessary refinement.

TROGLODYTIDAE

Cinnycerthia peruana peruana (Cabanis)

Maraynioc: 1 ♂. 19 June, 1939. 11,000 feet.
Chilpes: 1 ♀. 17 June, 1939. 10,000 feet.
"Eyes brown; bill gray-brown; legs dark brown."

The Maraynioc bird is exactly topotypical; it shows traces of albinism, the forehead and a small post-ocular spot on either side being white.

Habits exactly like those of *Schizocca palpebralis*. Some of the groups have a strong tendency towards albinism on the head, in fact, one specimen observed had a completely white crown.

Troglodytes musculus puna Berlepsch and Stolzmann

Maraynioc: 3 ♂. 8 March–17 May, 1939. 12,000–12,500 feet.
"Eyes dark brown; upper mandible black, lower mandible yellow; legs flesh-color."

Very common between the altitudes of 12,000 and 12,500 feet.

Troglodytes solstitialis macrourus Berlepsch and Stolzmann

Chilpes: 2 ♂. 1 and 14 June, 1939. 10,000–11,000 feet.
"Eyes dark brown; upper mandible dark brown, lower mandible flesh-color; legs light brown."

Common along the Chilpes trail where it does not go above the sub-tropical zone.

TURDIDAE

Turdus fuscater gigantodes Cabanis

Maraynioc: 1 ♂, 1 ♀ (with traces of immature plumage) 7 May and 7 March, 1939. 12,000 feet.
"Eyes dark brown; bill orange; legs orange" (adult); "legs lemon-yellow." (immature).

This large thrush was extremely common and conspicuous. It was typically thrush-like in all ways.

Turdus chiguanco chiguanco d'Orbigny

Matucana (74 km. northeast of Lima): 1 ♂. 28 February, 1939. 8,000 feet.
"Eyes chestnut; bill and legs bright orange-yellow."
Maraynioc: 1 imm. ♀, 1 juv. ♀, 1 juv. not sexed. 8 March–11 June, 1939. 12,000–12,500 feet.
"Eyes orange-brown; bill and legs dull orange-yellow" (immature); "bill dark brown; bill orange or yellow; legs yellow or lemon-yellow" (juvenal).

There is large amount of postmortem color change in this species, as in most thrushes. The Matucana bird, in somewhat worn plumage, is darker than an Ecuadorean skin collected eighteen years previous, while the immature from Maraynioc, in very fresh feather, is much more olivaceous, not as "foxed" as a series of six unworn specimens taken in 1916.

CYCLARHIDAE

Cyclarhis gujanensis gujanensis (Gmelin)

Chilpes: 1 ♀. 31 May, 1939. 6,000 feet.
"Eyes yellow; upper mandible very light brown, lower mandible blue-horn; legs bluish white."

Hellmayr places *C. g. albiventris* Carriker in the synonymy of typical race; in this he seems to be entirely correct. Certainly this

specimen should be referable to *albiventris* on geographical grounds, but I cannot detect any difference between it and Guiana birds. Even if the race should prove to be valid, Carriker's name cannot stand, since it is a homonym of *Cyclarhis albiventris* Sclater and Salvin, 1873.

COEREBIDAE

Diglossa baritula decorata Zimmer

Maraynioc: 1 ♀. 9 May, 1939. 12,000 feet.
"Eyes and legs brown; bill black."

This skin is that of an immature bird and does not present any racial characters; it is referred to *decorata* on geographical grounds.

Diglossa lafresnayii pectoralis Cabanis

Maraynioc: 3 ♂, 4 ♀. 7 March–17 May, 1939. 12,000–13,000 feet.
"Eyes dark brown; bill black or blue-gray; legs black or brown."

One of the commonest birds around Maraynioc.

Diglossa brunneiventris Lafresnaye

Maraynioc: 5 ♂, 2 ♀. 7 and 8 March, 1939. 12,000 feet.
"Eyes dark brown; bill black; legs brown."

Since the publication of Zimmer's paper in the Auk (**46**, 1929, p. 24–28) in which he reduced *brunneiventris* to a race of *D. carbonaria*, Carriker has found that the two occur together in northern Bolivia; it is therefore necessary to regard both forms as specifically distinct.

This bird is as common as *Diglossa lafresnayii pectoralis*.

Diglossa cyanea melanopsis Tschudi

Maraynioc: 2 ♂, 2 ♀. 22 March–19 May, 1939. 12,000 feet.
"Eyes red; bill black, legs brown."

Common at 12,000 feet, where it frequents the thick bushes.

Xenodacnis parina Cabanis

Maraynioc: 2 ♂, 3 ♀. 12 March–20 May, 1939. 12,000–12,500 feet.
"Eyes and legs brown; bill black."

These specimens are topotypical; Hellmayr gives Monterico, Department of Ayacucho, as the type locality, but Cabanis, in the original description where both male and female are described, states under each, "Hab. Maraynioc." The types were collected by Jelski.

Fairly common and found in small groups. This bird was much more common at 12,500 feet, where it frequents the low trees of the scattered copses found at this altitude, than at 12,000 feet.

Conirostrum sitticolor cyaneum Taczanowski

Maraynioc: 3 ad. ♂, 1 imm. ♂. 6 March–19 June, 1939. 11,500–12,000 feet.
"Eyes dark brown; bill and legs black" (adults);
"Eyes dark brown; bill black; legs brownish gray" (immature).

A fairly common bird, and usually found in groups.

COMPSOTHLYPIDAE

Myioborus melanocephalus melanocephalus (Tschudi)

Chilpes: 1 ♂. 14 June, 1939. 10,000 feet.
"Eyes dark brown; bill and legs black."

Basileuterus coronatus coronatus (Tschudi)

Chilpes: 1 ♂. 31 May, 1939. 6,000 feet.
"Eyes dark brown; bill black; legs brown."

THRAUPIDAE

Iridosornis rufivertex reinhardti (Sclater)

Chilpes: 1 ♀. 17 June, 1939. 10,000 feet.
"Eyes chestnut; upper mandible black, lower mandible blue-horn; legs dark brown."

While Hellmayr is doubtless correct in assigning this form to the *rufivertex* Formenkreis, it should be pointed out that in some respects it approaches the *jelskii* group. Both species occur in the humid temperate zone in the Department of Junín, but, as far as I can discover, the two have not yet been collected at the same locality, though Chilpes, where Griswold took *reinhardti*, is but a few miles from Maraynioc, the type locality of *jelskii*.

Delothraupis castaneoventris peruvianus Carriker

Maraynioc: 1 ♀. 5 May, 1939. 12,000 feet.
"Eyes red; upper mandible black, lower mandible blue-horn; legs brown."

This bird differs from a Bolivian bird (not sexed) in just the characters pointed out by Zimmer in 1930, and those relied on by Carriker for the separation of the northern race; characters admitted also by Hellmayr, but dismissed as being "quite insignificant." In brief, the Peruvian race differs from topotypical Bolivian birds in larger size and deeper and more uniform rufescent underparts. The Maraynioc bird has a wing of 82.5 mm.; the Bolivian one of 79.5.

Anisognathus igniventris ignicrissus (Cabanis)

Maraynioc: 1 ♂, 4 ♀. 2 March–11 June, 1939. 11,000–12,000 feet.
"Eyes brown; bill and legs black."

This series is exactly topotypical.

Zimmer has already shown that the generic name Anisognathus Reichenbach, 1850 is not a *nomen nudum* but was properly introduced, and of course under the International Code is not preoccupied by Anisognatha Lacordaire, 1848, Coleoptera. It is therefore necessary to employ Anisognathus as the generic name of the tanagers included in the genus Poecilothraupis Cabanis, 1851.

This handsome tanager was quite common and fairly tame. Its altitudinal range was more varied than practically any other bird collected, ranging from 10,000 to 12,500 feet. It was always found in small groups.

Anisognathus lacrymosus lacrymosus (DuBus)

Maraynioc: 1 ♂, 3 ♀. 18 March–24 May, 1939. 11,500–12,000 feet.
"Eyes brown; bill and legs black."

A male, taken 10 April, has a few scattered yellow feathers on the sides of the nape, an indication of the yellow post auricular spot present in all the other races of this species except *melanogenys*.

Like *A. igniventris ignicrissus*, this tanager is always found in small groups.

Buthraupis montana cyanonota Berlepsch and Stolzmann

Chilpes: 1 ♂. 1 June, 1939. 9,000 feet.
"Eyes orange-red; bill and legs black."

The type locality of *cyanonota* is Maraynioc, hence Griswold's bird is practically topotypical.

Common along the Chilpes trail, where it was usually found in groups, feeding in the tree tops.

Hemispingus atro-pileus auricularis Cabanis

Maraynioc: 2 ♀, 1 ♀ ?, 1 not sexed. 19 and 22 March, 1939.
"Eyes brown; bill gray or gray-brown; legs gray."

Chlorornis riefferii elegans Tschudi

Maraynioc: 1 ♂. 1 April, 1939. 8,000 feet.
"Eyes chestnut; bill and legs red."

CATAMBLYRHYNCHIDAE

Catamblyrhynchus diadema citrinifrons Berlepsch and Stolzmann

Maraynioc: 4 ♂, 2 ♀. 10 March–19 June, 1939. 11,000–12,000 feet.
"Eyes and legs brown; bill black."

A nice series of topotypes of this well-characterized race. The patch of plush-like feathers on the fore crown is more nearly lemon-yellow instead of orange-yellow, as in the typical race; the sides of head are a paler reddish brown, not deep chestnut, and the underparts are lighter.

A common bird between 11,000 and 12,000 feet. It is usually seen in small groups, along with such other birds as *Diglossa cyanea melanopsis* and *Atlapetes schistaceus taczanowskii*.

FRINGILLIDAE

Catamenia inornata minor Berlepsch

Maraynioc: 1 ♀ ?. 6 March, 1939. 12,000 feet.
"Bill pink; legs flesh-color."

Catamenia homochroa homochroa Sclater

Maraynioc: 2 ♂, 2 ♀, 1 juv. 13 March–6 May, 1939. 12,000 feet.
"Eyes brown; bill flesh; legs brown" (adults).

A common finch between 12,000 and 12,500 feet.

Phrygilus unicolor inca Zimmer

Maraynioc: 1 ♂, 1 ♀. 23 May and 18 June, 1939. 12,500 feet.
"Eyes dark brown; bill very dark gray; legs brown."

For many years I have felt the genus Phrygilus to be an unnatural assemblage of quite unrelated species, and that a revision could be undertaken to advantage. Hellmayr is entirely correct in reviving Melanodera of Bonaparte for *melanodera* and *xanthogamma*, but additional dismemberment would show better the relationships of the remaining species. The blue-gray and yellow Phrygili (*patagonicus* and *gayi*) are probably most nearly related to Junco: *fruticeti* probably belongs in the monotypic genus Rhopospina; *alaudinus* and *unicolor* are hardly congeneric. There are, however, several species that I have not seen, and this lack of material together with the lack of time required to undertake such a revision, prevents further discussion. I should like to recommend a thorough investigation of the genus Phrygilus, as currently constituted, as an attractive research project.

Atlapetes (Atlapetes) schistaceus taczanowskii Sclater and Salvin

Maraynioc: 3 ♂, 3 ♀. 8 March–28 May, 1939. 12,000 feet.
"Eyes chestnut; bill black; legs dark brown."

A rather common bird around 12,000 feet, where it frequents the many small woods. It is usually in pairs.

Atlapetes (Buarremon) torquatus poliophrys (Berlepsch and Stolzmann)

Chilpes: 1 ♂. 14 June, 1939. 10,000 feet.
"Eyes dark brown; bill black; legs light brown."

Hellmayr has recently united Atlapetes and Buarremon, since he is unable to discover any constant external differences that would justify continued generic separation. On the other hand, Atlapetes and Buarremon each exemplify a very different underlying pattern of coloration, and for this reason I feel that the separation of the two should be retained in the subgeneric sense.

Brachyspiza capensis peruviensis (Lesson)

Marayniоc: 7 ♂ (4 ad., 2 juv., 1 fledgl.). 6 March–20 June, 1939. 12,000–12,500 feet.

"Eyes chestnut; bill gray; legs flesh-color" (adults).

van Rossem has published (1929, p. 548–550) a note, together with a table of proportions, to prove that Zonotrichia and Brachyspiza are congeneric. The only characters used were (a) relative proportions of tail to wing; (b) relative proportions of tarsus to wing; (c) relative proportions of tarsus to tail. This table of relative proportions was based on measurements of adequate numbers of all the species of Zonotrichia and two races (*costaricensis* and *canicapilla*) of Brachyspiza. On the basis of the results obtained van Rossem is certainly justified in uniting the two genera under the oldest name, but in my estimation, his investigation is too narrow in scope; he certainly should have included Melospiza (*melodia*, *georgiana* and *lincolnii*) though not Passerella, additional races of Brachyspiza and other features in addition to the three sets of proportional measurements. Possibly such a broadened investigation might result in merging both Zonotrichia and Brachyspiza with Melospiza, or it might result in the maintainance of two or more genera but with different limits.

The commonest and one of the tamest birds between 12,000 and 12,500 feet.

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PLATES

PLATE 1

PLATE 1

Author's Sketch Map of the Hacienda Maraynioc. Dotted areas indicate principal areas. Dashes (- - - - -) indicate trails.

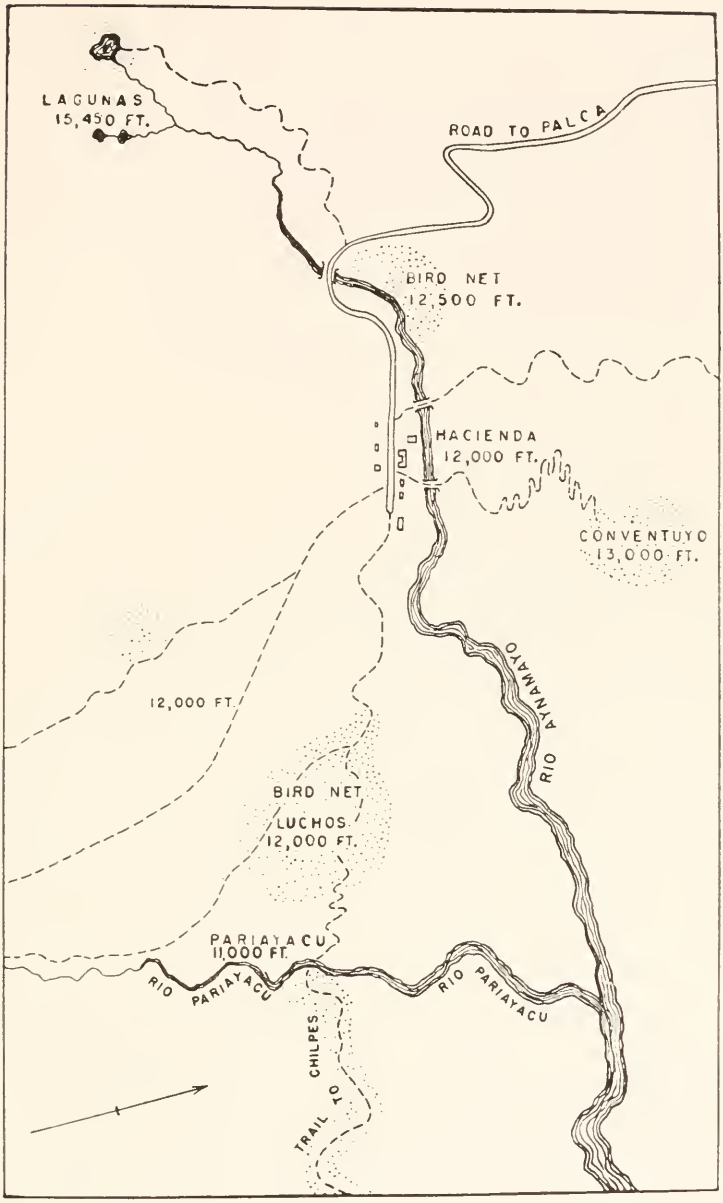
LAGUNAS
15,450 FT.
ROAD TO PALCA
BIRD NET
12,500 FT.
HACIENDA
12,000 FT.
CONVENTUYO
13,000 FT.
RIO AMAMATO
12,000 FT.
BIRD NET
LUCHOS
12,000 FT.
PARIAYACU
11,000 FT.
RIO PARIAYACU
RIO PARIAYACU
TRAIL TO CHILPES

PLATE 2

PLATE 2

The "Lagunas" (15,450 feet).

PLATE 3

PLATE 3

Hacienda Maraynioc, 12,000 feet, showing large sheep barn in the foreground, and the road to Palca running up the mountain side, in the background.

PLATE 4

PLATE 4

The headwaters of the Pariayacu River. (11,000 feet).

PLATE 5

PLATE 5

"The Hacienda" taken from the district known as Conventuyo (13,000 feet). Road to Palca traversing mountain ridge in the background. (See sketch map, Plate 1).

Bulletin of the Museum of Comparative Zoölogy
AT HARVARD COLLEGE
VOL. XCII, No. 5

RECENT MOUNTS OF FOSSIL REPTILES AND AMPHIBIANS IN THE MUSEUM OF COMPARATIVE ZOÖLOGY

BY ALFRED SHERWOOD ROMER

WITH TWO PLATES

CAMBRIDGE, MASS., U.S.A.
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No. 5 — *Recent Mounts of Fossil Reptiles and Amphibians in the Museum of Comparative Zoölogy*

By Alfred Sherwood Romer

During the past decade a considerable portion of the paleontological work of the Museum of Comparative Zoölogy has been devoted to the collection, preparation and study of reptiles and amphibians from the older geological periods, principally from the Permo-Carboniferous redbeds of the American Southwest. Correlated with this work has been the execution by Mr. George Nelson, Chief Preparator, of a series of panel mounts of articulated skeletons, which are highly noteworthy from both technical and artistic points of view. These mounts are figured and described briefly here. The collectors of the various specimens are noted below. Most of the preparation was done by Mr. R. V. Witter, Assistant Preparator, 1935–42; the dicynodont skeleton was prepared by Mr. Russell Olsen. The field work involved was supported in most cases by funds from the Milton fund of Harvard University, from Thomas Barbour, and from the Department of Biology.

Ophiacodon uniformis

Plate 1, Fig. 1

A primitive Texas pelycosaur of modest size; usually known as "*Poliosaurus*" but referable to the genus *Ophiacodon* and very similar to *O. mirus* from the redbeds of New Mexico. This skeleton (No. 1366) is the only one of any degree of completeness known and is used as a basis for description of the species in the recent "Review of the Pelycosauria" by Romer and Price (1940, pp. 238–242, etc.), and for the general account of the *Ophiacodon* skull in the same work (pp. 201–205, 226–229, pls. 1–4). The length of the skeleton as mounted is approximately five and a half feet. The specimen (as well as that of *Dimetrodon milleri*, described below) was obtained in 1936 by a party under the direction of R. V. Witter from a newly discovered bonebed situated one mile southwest of Archer City, Texas, in the Putnam Formation of the Wichita Group.

The discovery of the Archer City bonebed has proved to be an event of considerable interest in the study of stratigraphic distribution of Texas redbeds vertebrates. Most well-known forms have been found in two horizons: (1) the lower portion of the Arroyo Formation of the

Clear Fork Group, and (2) a somewhat lower set of localities in the upper part of the Wichita Group (Belle Plains Formation and the uppermost part of the Admiral formation). Work in recent years had shown that the vertebrate fauna was present at much lower levels, but remains were fragmentary. The Archer City locality gives us a third horizon, well down in the Wichita, with articulated material representing a number of representative genera. It is to be hoped that some similar find in the future will give us comparable data for the Moran and Pueblo Formations still lower in the stratigraphic sequence.

Dimetrodon limbatus

Plate 1, Fig. 2

The skeleton of this characteristic Wichita species of long-spined pelycosaur is nearly complete except for portions of the feet and tail. This individual formed the basis for most of the figures and descriptions of the *Dimetrodon* skeleton in the "Review of the Pelycosauria." (pls. 6–16, 23–25, 27–29, 31).

The specimen, No. 1347, was collected by A. S. Romer from the east (or south) side of Godwin Creek at a horizon close to the boundary between Admiral and Belle Plains Formations of the Wichita Group. As mounted the skeleton is seven feet in length; the tail, however, is incomplete, and comparison with *Dimetrodon milleri* indicates that the actual length was a foot greater. Size and dental characters suggest that our specimen was a female; the rather larger individual from the same locality mounted in the American Museum of Natural History (Case, 1910, pl. 19) is presumably a male, as is a mounted skeleton in Walker Museum of the University of Chicago (Baur and Case, 1899, etc.). A mounted skeleton in the University of Michigan (Case, 1915) is a composite, but most of the material is of the presumed female size.

Apart from the specimens of *D. limbatus* listed above, mounted specimens of *Dimetrodon* are few in number. *D. grandis*, the giant of the genus is mounted in the National Museum (Gilmore, 1919). Walker Museum possesses a specimen of *D. loomisi* with a splendidly preserved series of spines (Romer, 1927), and a composite skeleton in Tübingen (von Huene, 1919, pp. 177–181, pl. 6) is apparently of this species. Apart from the specimen of *D. milleri* noted below the other species of *Dimetrodon* are not as yet known from material adequate for purposes of mounting.

Dimetrodon milleri

Plate 1, Fig. 3

The type and only known skeleton of an unusually small and primitive species of *Dimetrodon*. The specimen (No. 1365) is one of the most completely preserved of any Texas reptile, exhibiting, except for some spine fragments, every detail of its anatomy to the tip of toes and tail. The slender tail includes 62 vertebrae, proving conclusively that *Dimetrodon* was a very long-tailed form. The skeleton was obtained from the Archer City bonebed mentioned above. Lying between the ribs, in the proper position for the stomach were bones of the amphibian *Zatrachys*, presumably its last meal.

It is obvious from simple inspection that the spines of this relatively small and early *Dimetrodon* are proportionately shorter than in *D. limbatus*. A similar relation between size and spine length is found in all species of *Dimetrodon* for which we have adequate material, and the genus thus affords an excellent example of heterogonic growth. A mathematical treatment of the data indicates that with increase of size of species in successively later geologic levels, the spine length increases at a rate nearly twice that of the other linear measurements.

Edaphosaurus boanerges

Plate 2, Fig. 1

E. boanerges is a member of the "ship-lizard" group of pelycosaurs, usually referred to under the very appropriate but unfortunately incorrect generic designation of *Naosaurus*. The specimen (No. 1531) is a composite but includes the holotypic material of the species. As mounted it is approximately eight feet in length. It was obtained from the Geraldine bonebed in the lower portion of the Admiral Formation in Archer Co., Texas.

The complete backbone as mounted shows 27 presacral vertebrae; this was thought to be the proper number at the time the mount was made (cf. Romer and Price, pp. 382, 392), but further material from Geraldine indicates that 23 was the proper number. In addition new material shows that the tail is inaccurate in some respects. (cf Shuler and Witter, 1942).

The Geraldine bonebed (Romer and Price, pp. 175, 176; Shuler and Witter, 1942) from which the present skeleton was obtained, is a de-

posit of unusual interest which is rivalled, among Texas localities, only by the Craddock and Briar Creek bonebeds. It was discovered by the writer in 1932 and worked by groups from Harvard University on a number of subsequent occasions. The matrix is for the most part a gray clay, apparently with a large percentage of its contents of organic derivation, containing many carbonized logs and yielding numerous plant impressions. These show that the florule consisted of lush plants with luxuriant growth, in contrast to the xerophytic types composing the typical redbeds flora. The Geraldine deposit, it seems, was formed in a bog in which a host of reptiles and amphibians became mired and died. *Edaphosaurus*, presumably a feeder on plant materials of the type found here, is the most abundant reptile occurring in the deposit. More than a dozen articulated individuals have been found, in addition to numerous fragmentary remains. The amphibians *Eryops* and *Cricotus* are fairly common; a tiny *Dimetrodon* is known from scattered remains. There are almost no traces of other genera.

In addition to the Harvard mount, skeletons of *Edaphosaurus* from Geraldine are mounted at the University of Oklahoma, Amherst College, and Southern Methodist University; it is probable that further mounts from this locality will be made at Yale, Pittsburgh, the U. S. National Museum and possibly other institutions. Three other mounted *Edaphosaurus* skeletons are in existence. Specimens at the University of Chicago (Williston, 1916, figs. 80, 81; 1918, pp. 96, 101–103, figs. 8, 14a–b) and the University of Michigan (Case, 1918) are from the Briar Creek bonebed in the upper part of the Admiral Formation; a mounted skeleton of the large *E. pogonias* from the Clear Fork Group is in the American Museum of Natural History (Osborn, 1907; Case, 1907, p. 138, fig. 62). The last, as originally mounted, was a composite including a *Dimetrodon* skull and *Dimetrodon* limb bones.

Specific determinations of *Edaphosaurus* specimens found in Texas have proved difficult. *E. boanerges* is the geologically oldest and smallest of adequately known forms. Somewhat higher in the series, there are remains from the upper part of the Admiral Formation and the Belle Plains Formation. These specimens have usually been assigned to *E. cruciger*. However most appear to be closer to *E. boanerges*, although a bit larger, and possibly sub-specifically or specifically distinct. *E. cruciger* in a proper sense appears to be characteristic of the Clyde Formation (possibly the highest levels of the Belle Plains). This form is poorly known, and best represented by a vertebral column in the American Museum (Case, 1907, pl. 32, etc.) and an undescribed

partial skeleton in this museum. The final phyletic stage is *E. pogonias* of the Clear Fork, with which "*Naosaurus*" *claviger* appears to be synonymous.

Eryops megacephalus

Plate 2, Fig. 2

Although fragmentary remains of this large Permo-Carboniferous amphibian are among the commonest of fossils in the Texas redbeds, articulated skeletons are rare. The present specimen is the most perfect yet discovered. It includes a nearly complete tail; an American Museum mount (Miner, 1925, p. 154, etc.) which most nearly approaches it in completeness contains only the proximal members of the caudal series. The skeleton (No. 1539) is about five and a half feet long as mounted. It was collected by L. I. Price in 1937 from the Belle Plains Formation of the Wichita Group, north of the Little Wichita River near the eastern line of Baylor County, Texas. The expedition was supported by the Marsh Fund of the National Academy of Sciences. A description of the skin impressions has already been published (Romer and Witter, 1941); its skeleton forms the basis for a general account of the osteology of *Eryops* now in preparation.

Two other skeletons of *Eryops* are on exhibition. One in the American Museum, noted above, was collected by Case from the upper part of the Admiral formation. The second, at the University of Chicago, was collected by the writer in the Clyde Formation near Electra; it is unusually well preserved as far back as the lumbar region, but the hind legs and tail are composite and restored. A third mount of *Eryops* to be exhibited in the Peabody Museum of Yale University, is in preparation.

As is customary, we have referred our specimen to *E. megacephalus*, the genotype. It is highly probable that, as is definitely known to be the case in a number of other genera, the Texas sequence contains several species of this genus. Sawin, as a result of his cranial studies (1941), believes that the cranial material indicates the presence of at least two species, and the postcranial material studied by the writer shows a considerable amount of variation.

Dinodontosaurus oliveirai gen. et spec. nov.

Plate 2, Fig. 3

This large dicynodont is the first skeleton mounted from the series of skeletons obtained from the Triassic of southern Brazil by L. I. Price and Dr. T. E. White in 1936–37 during the course of an expedition supported by a grant from the Milton Fund of Harvard University (cf. Annual Reports of the Museum of Comparative Zoölogy for 1935–36, 1936–37). Previous work in these beds by von Huene had resulted in the discovery of numerous rhynchosaurs and some cynodonts, but of dicynodonts he found little apart from the single form *Stahleckeria*. Price and White, on the contrary, obtained a large and varied suite of dicynodonts. The specimen mounted (No. 1670) is now designated the holotype of one of the larger forms. It was found at Rio do Rasto, 16 km. south of Candelaria, State of Rio Grande do Sul. A brief diagnosis will be given here; a more adequate description will be published at some later time. *Dinodontosaurus* may be defined as a genus of dicynodont therapsids in which maxillary tusks are present, in one sex at least, but other teeth are entirely lost; skull relatively long and narrow, the width being about two-thirds the length; the elongation is mainly in the facial region, the orbits being situated about two-thirds back along the length of the skull. The skull table is much compressed, the two post-orbital crests approaching one another closely above the parietal. The transverse occipital crest tilts backward dorsally, so that the occipital surface is not seen from above. Nasal rugosities are absent. From *Kannemeyeria* of the South African Triassic, *Dinodontosaurus* is readily distinguished by the relatively slight development of the "sagittal crest," so that the skull roof has a straight dorsal margin as seen in side view rather than the marked convexity of *Kannemeyeria*. Since the genus is monotypic, we shall provisionally characterize the species, *D. oliveirai*, on the basis of size alone. The skull length is 364 mm., the length of the presacral column 98 cm.; the total length as restored approximately 180 cm. (6 feet). The specific name is in honor of Dr. Euzebio de Oliveira, former director of the Brazilian Geological Survey and one of many Brazilian friends who gave invaluable aid to the Brazilian collecting party.

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PLATES

PLATE 1

PLATE 1

Fig. 1. *Ophiacodon uniformis.* Fig. 2. *Dimetrodon limbatus.*
Fig. 3. *Dimetrodon milleri.*

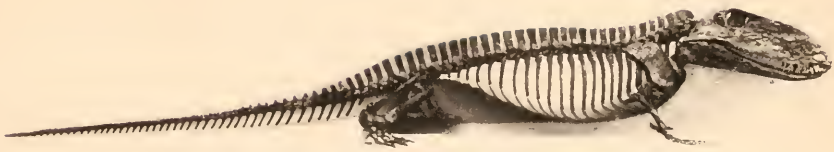

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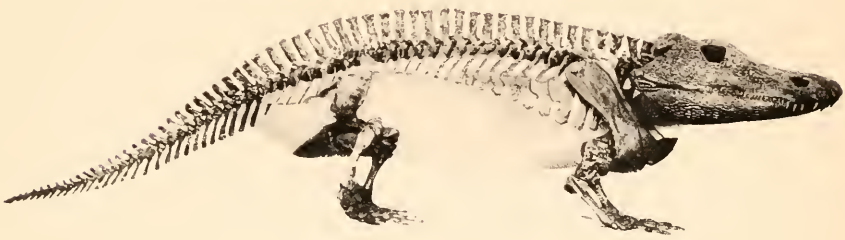
PLATE 2

PLATE 2

Fig. 1. *Edaphosaurus boanerges.* Fig. 2. *Eryops megacephalus* (photograph is reversed). Fig. 3. *Dinodontosaurus oliveirai.*

1



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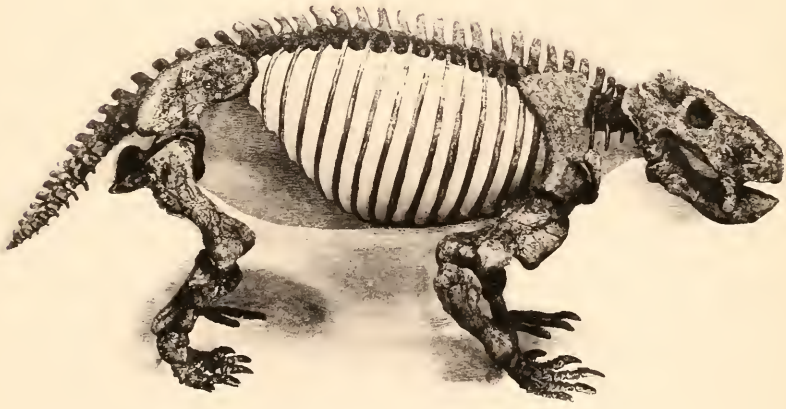

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Bulletin of the Museum of Comparative Zoology
AT HARVARD COLLEGE
VOL. XCII, NO. 6

NOTES AND DESCRIPTIONS OF NEARCTIC TRICHOPTERA

BY NATHAN BANKS

WITH SIX PLATES

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PRINTED FOR THE MUSEUM
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JUN 17 1943
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No. 6—*Notes and Descriptions of Nearctic Trichoptera*[1]

By Nathan Banks

In the course of checking on the material in the collection of the Museum of Comparative Zoölogy I have found various undescribed species, some of which are here described, and I have included notes on a number of described species, especially in the genus Dicosmoecus. Fortunately there is a male like the type and paratype of *Limnephilus scabripennis* from Plymouth, Mass.; this enables me to describe the allied forms.

Dr. H. H. Ross, in his paper on lectotypes in this Museum, naturally did not figure species based on one specimen. However, he often made preparations, and I have figured these for several species.

LIMNEPHILIDAE

Limnephilus adustus Bks.

Figs. 55, 56, 60

This was placed by Milne as a synonym of *perjurus* Hagen. Hagen's type is a female without abdomen, but the front tibiae have the spines black, in *adustus* some are pale, and in *perjurus* the fourth apical cell is fairly wide at base, in *adustus* very narrow. There are various minor differences, and so few points just the same it is evident that *adustus* is quite different from *perjurus*. Ross does not mention *adustus*, but does refer to *perjurus* as a female without abdomen. He, however, made a preparation of the genitalia, and I present figures. The superior appendages of female are rather long, swollen toward base, with a very slender acuminate tip.

The type is from Banff, Alta., 21 August; other males are from Eagle Lake, Maine (Packard), females from Slave Lake, H.B. Terr. (Kennicott), Flowers Cove, Newfoundland, 17 August (Fernald), and British Columbia (Crotch).

Limnephilus sublunatus Prov.

L. macgillivrayi Bks. was based on a male from northern New York, and *L. americanus* on females from Idaho. With more specimens it is now seen they are one species; Milne places the first as *sublunatus* and Ross the second as *sublunatus;* I have not seen the type nor any figures of *sublunatus*, but doubtless they are correct.

[1] Published with the aid of a special gift from Mr. George R. Agassiz.

Milne placed as male of *americanus* a specimen from Cultus Lake, British Columbia, but it is larger with differences in venation, and I consider a different species, certainly not *macgillivrayi*.

Limnephilus hyalinus Hag.

Figs. 53, 54

This has been placed as a synonym of *L. extractus* Walk; but now that the genitalia of Walker's species has been figured in "Walker Trichoptera" it is seen that *L. hyalinus* is quite different. Ross gives no figure but refers to two of Betten's figures; No. 5 of Plate 46 is good except that the process on the side of the sheath is provided with three long spines, overlapping, and which may be so placed as to be unnoticed. The upper lateral piece, seen from within, has a broad black ridge or low process, and the blunt, truncate, black tip of the intermediate appendage is close to it, sometimes appearing as if united.

The species is common across northern United States and southern Canada. Besides the type the Museum of Comparative Zoölogy has specimens from Quesnal Lake, Brit. Col.; Vernon, Brit. Col.; Westbourne, Man.; Husavick, Man.; Temegami, Ont.; Mattewa, Ont.; Guelph, Ont.; Hull, Que.; Chatinguay, Que.; Lacolle, Que.; Ogussoc, Maine; Pinnacle Mt., Fulton Co., N. Y.; Freeville, N. Y.; Claremont, N. H.; Westport, N. Y.; Rock Lake, N. Dak.; and Great Lake, Colo.

Limnephilus flavastellus Bks.

Figs. 58, 59, 65

This has been placed as a synonym of *L. externus*. The species is much more yellowish on the fore wings, smaller, and with a proportionally shorter discal cell. The difference in the shape of the superior appendages of the females is readily noted, (see figs. 64, 65). The genitalia of the males is extremely similar; the cercus (seen from side) is more pointed at upper tip in *externus* (Figs. 66, 67) and the large black tooth is conical; in *flavastellus* the tooth is rounded.

Specimens from British Columbia and Alaska are *flavastellus*, from Idaho east to Cape Breton, Nova Scotia are the common *externus*.

Anabolia sordida Hagen

Ross says this has been considered to be *A. bimaculata*, and gives no figure. However, it is not *bimaculata*, but the species recently described

by Denning as *A. longicereus*. Besides the male type from North Red River, Uhler 1858, there is another male from Upper Wisconsin River Uhler, 1860.

Astenophylax hesperus Bks.

Fig. 44

Of this species, described from one male as a Stenophylax, I now have specimens from Rosemary Inn, Olympic Mts., Wash., 21 to 29 July, (G. H. and J. L. Sperry). It belongs to Astenophylax inasmuch as there is a very short cross-vein connecting the subcosta to radius toward tip of wing; in some cases the radius and subcosta are united at one point.

Astenophylax needhami Ling is a synonym of *hesperus*. The male genitalia have the superior plates large concave from above, the outer part rolled over toward the middle, very different from those of *A. argus*. The claspers, from behind, are simple, elongate, somewhat pear-shaped with a smooth upper tip, not nearly as slender as in *argus*.

The upper tip of the female abdomen ends in very small fusiform plates, very unlike the broad plate with a median notch of *argus*. The female has the fore wings of the same uniform brownish color as the male.

Clistoronia magnifica Bks.

Figs. 40, 43, 49

Ross gives no figure, so I figure the preparation he made. From above one sees two large triangular, divergent processes; from the side are two rounded lobes. The penis is a remarkable structure; the membraneous ribbed sheath is traversed by the dark tube, its tip but little modified; from each side near the middle arises a long curved process, toward tip divided into two branches, the upper one erect, long and tapering and on one edge with many long somewhat scale-like spines, the lower process curves upward, and, except for the tip, mostly clothed with long scale-like hairs or spines, many overlapping.

Clistoronia maculata Bks.

Fig. 47

Ross says this is the same as *formosa* Bks. The markings are much darker and heavier in both sexes. It is true that the male genitalia are

very similar, but in *maculata* the superior appendage, from side, has the lower outer corner not at all projecting as it does in *formosa;* the outer edge in *maculata* is an even concave curve; in *formosa* it is broken near middle by a hump, and in *formosa* the outer upper corner projects more than in *maculata.* The titillators of the penis-sheath are very similar, but in *formosa* the hyaline apical fringed part is broader than in *maculata.*

The females, which are marked in the same manner and amount as the males, are very easily separated. In *formosa* (Fig. 48) at tip of abdomen above is an elongate median piece with a median notch; in *maculata* this piece is very broad and short, with a distinct point in the middle; the lower median appendages are longer in *maculata* than in *formosa.*

I have another female of *maculata* from the White Mts. of Arizona, closely matching the original.

Pycnopsyche scabripennis Rbr.

Fig. 42

Rambur described this species thinking that it might be European, the specimens having no locality label. The type in Brussels Museum was figured by Ulmer; it is number 14 Coll. Latreille, the specimen in the Hagen collection has a label 13, and another "Coll. Latreille", Hagen has added a label "Amerique sept." The Hagen specimen, like the type, is a female and without abdomen. It also lacks one fore and one hind wing. The venation agrees with the Ulmer figure of the type; the discal cell is a little shorter than its pedicel; the granulations of the wing are not numerous as in *P. antica,* nor are they as large. The dark markings in this species are more prominent than in *P. conspersa,* but much as in *P. antica.*

Length of fore wing 16 mm.

Besides the cotype, without locality, there is a male from Plymouth, Mass., Sept. collected by E. A. Carpenter (father of Prof. F. M. Carpenter).

Pycnopsyche antica Walk.

Figs. 30, 31, 32

Based on a female from Georgia, Abbot collection. Figures and further description are given in "The Walker Trichoptera." The discal cell is fully one-half longer than the pedicel; the fore wing

strongly and fairly evenly granulate. The tip of last dorsal segment of abdomen is nearly truncate, the clasper is much like that of 6b in figure 58, page 346 of Betten's New York Trichoptera, the tip plainly blackened, truncate, outer corner prolonged, the inner edge with a notch and a tooth; the penis-sheath is rather swollen and with long appressed yellowish spines; at tip is one each side that is dark. The markings of fore wing vary much in distinctness.

Length of fore wing 19 to 20 mm.

From Georgia, Gerhard, 1860 (Hagen coll.); Auburn, Ala., (Baker); Pisgah Forest, N. Car., August; Black Mts., N. Car., Sept., (Beutenmuller); New Bloomfield, Penna., 6, and 12 Sept. (Daecke); White Mts., N. H., (Morrison); Baddeck, Nova Scotia, 14 Aug. (Fairchild); Englishtown, Cape Breton, Nova Scotia (Fairchild).

Pycnopsyche minima spec. nov.

Figs. 38, 39

In general this is a small form of *P. antica,* the discal cell being plainly longer than its pedicel; in marks, shape, and venation much like *antica;* the discal cell about five millimeters long and the pedicel only a little over three. The brown spots are more numerous toward the outer end so that they tend to form a border. The last dorsal segment of the abdomen projects roundedly more than *antica,* the lower lateral prolonged part is longer than in *antica.* The penis-sheath is covered with long appressed spines. The clasper has a truncate tip, no tooth at outer corner; the inner corner with a small sharp incision.

Length of fore wing 15 to 16 mm.

From Falls Church, Virginia, 8 and 22 October; and Lakehurst, New Jersey, 23 August. Type M.C.Z. No. 25825.

Pycnopsyche conspersa spec. nov.

Figs. 45, 46

This species agrees with *antica* in having the discal cell much longer than the pedicel. The fore wings are not so heavily marked as the other species; the brown spots are small and rather evenly scattered, except there are few in front of the discal cell; the band up from the hind margin across to discal cell is very faint; the brown mark beyond anastomosis is distinct, but short, and encloses the black dot in base of fork two.

The apical edge of the last dorsal segment of abdomen is truncate, not projecting, the lateral lobes of moderate length, the tip of clasper is not blackened, and in shape much as figured by Betten, figure 58, c, but the top is rather more truncate, evidently the same species; the intermediate appendages are pale (dark in other species), widened before the slender tip, the branches not divergent as in others.

Fore wing 18 mm. long.

A male from White Mts., N. H. (Morrison). Type M.C.Z. No. 25826. Dr. Betten gives the locality for his specimens as Old Forge, N. Y.

Pycnopsyche perplexa Betten

Fig. 35

This is the species that Milne identified as *P. dan* Sibley, but Dr. Betten says that *dan* is a synonym of *divergens*. A comparison of the females here with the description and figures of *perplexa* show they are the same. Normally in Pycnopsyche the base of the fourth apical cell is longer than the base of the fifth; in this species the relation is reversed. In the male the tip of the last segment above is broadly black across, not the usual two spots. Beneath are three black spots nearly in a row, the middle one is the double tip of the intermediate appendages, and the lateral ones the blackened inner tips of the claspers. These tips are broad (not pointed as in *divergens*). The penis-sheath has a number of stout spines each side.

Specimens are from Balsam, N. Car., 17 Sept.; North Mountain, Penna., Sept.; Ithaca, N. Y., 5 and 28 Sept.; Bar Harbor, Maine, 13 Sept.; Orono, Maine, July; and Baddeck, Nova Scotia, 4 Sept.

Allotype, Ithaca, N. Y., 28 Sept.

Rhadicoleptus sperryi spec. nov.

Figs. 2, 11, 12

♂ Body, legs, and antennae pale dull yellowish, basal joint of antennae more brown, tibiae and tarsi still paler yellowish, tip of abdomen brown; fore wings pale brownish yellow, with various silvery white spots and streaks, each margined with darker brown. A long silvery spot behind radius at about middle of length of wing; a round spot at apex of discal cell, a smaller one just behind it; a longer silvery streak behind the discal cell, reaching nearly one-half way to base.

Second apical cell with a long silvery spot at base, third apical cell with a short spot at base, and beyond is a longer streak, narrowed before tip; fourth apical cell with a small spot at base, and another beyond, half way to tip; fifth apical cell with a long spot at base, sixth apical with a shorter triangular spot near base.

Hind wings hyaline, with white fringe, veins white or pale yellowish. Head and thorax with snow-white hair; male palpi slender, second and third joints subequal; spines on legs black, spurs 1, 2, 3. The venation of fore wings is much like that of *flavicollis* and *fumosus*, but the discal cell is only about one and one-half times as long as the pedicel (in the others about twice as long), and the third and fourth apical cells are more narrowed at base than in those species. The last dorsal segment of abdomen shows a transverse, black spot each side on the apical part which is bent downward; the upper lateral pieces project roundedly below, and with much long white hair; the lower lateral pieces elongate triangular from side, sharp-pointed above, and seen from above project as a dark blunt tooth beyond the upper lateral pieces. Between them the penis has a slender, sharp tip, more swollen toward base.

In the female the silvery spots are not so large; there is no spot in the discal at tip, but in one wing a small round one before middle; the long streak behind discal cell is more interrupted behind, the spots on the fifth and sixth apical cells are the same as male, that in the second apical cell also the same, except a cloud in hind part; the third and fourth apical cells have very short silvery spot at base, and beyond in each cell there is a silvery spot more than its length before tip.

Length of fore wing 15 to 16 mm.

A pair from the White Mountains of Arizona, 20 June, 1935, taken by Grace H. and John L. Sperry. Type M.C.Z. No. 25757.

Readily separated from *flavicollis* and *fumosus* by the arrangement of silvery spots on fore wing, as well as by the shape of the parts of the male genital appendages.

Hesperophylax designatus var. isolatus var. nov.

Figs. 77, 78

In general similar to *designatus* from Hudson's Bay and Western Canada. The silvery marks on fore wings scarcely reach tip, but in shape like *designatus*. The fore wings are short and rounded at tip as in *designatus*. The principal difference is that the superior appendages are plainly narrowed before tip on upper edge much as in *incisus*.

The claspers have the apical narrowed portion shorter than in *designatus*, and the sheaths have rather longer spines at tip.

Size as in *designatus*.

Two males from Mt. Katahdin, Maine, Camp Kennedy, 3000 ft., August, Type M.C.Z. No. 25846.

Hesperophylax incisus spec. nov.

Figs. 24, 26, 27

Of the size and appearance of *H. magnus*, the silvery stripe on the fore wing being the same, not indented on each edge as in *H. occidentalis;* the structure and venation the same. In the male the upper lateral appendage shows a fairly large projection or tooth at the lower tip, much broader and not as long as in *H. magnus*, and the titillators are somewhat different as in figure. The female has two short, broad, flat pieces at tip of abdomen, quite different from the much narrower ones of *H. occidentalis*, and the very much longer and slender pieces of *H. magnus*.

Otherwise there is little difference.

Males of *incisus* come from Wallace, Idaho, 14 Sept. (Holotype) and 8 Sept.; Monache, Calif., 8300 ft., 11 July (Pilate in Eddy coll.); E. Humboldt Mts., Elko Co., Nevada, 24 June (G. H. and J. L. Sperry); and Saskatchewan, Canada, July.

Females from Wallace, Idaho, 26 Aug., 16, 30 Sept., 30 October; Nebo Junction, Utah, 12 July (G. H. and J. L. Sperry); Wellington, Brit. Columbia (Th. Bryant); Stockton, Utah (Spalding); and San Bernardino Mts. (Fish Creek) 6500 ft., Calif. (Grinnell). M.C.Z. type No. 25761.

H. magnus was based on several specimens; the lectotype male is the one from Palmerlee, Cochise Co., Arizona. This has the upper lateral appendage with a slender, elongate process at lower outer corner. Similar males are from Redington, Arizona and Carrizo, New Mexico. At time of description I had no females from Arizona, but put as female specimens from Utah and California. Since then I have received females from Arizona and New Mexico which have the superior plates at tip of abdomen very long and slender; these I consider the true females of *H. magnus* and herewith (Fig. 15) their appendages, and those previously used as females of *H. magnus* go with *H. incisus*.

The three very similar species (*occidentalis, magnus,* and *incisus*)

are readily separated by the external genitalia of both sexes. See Figs. 15, 16, 17, 18, 19, 25.

Hylepsyche

This genus is readily separated from Platycentropus by lacking the spines on the venter of both sexes of Platycentropus.

The genitalia of the male type of *H. indistinctus* is now figured in the "Walker Trichoptera." The type was from "Newfoundland" and the Museum of Comparative Zoölogy has two males from Grand Lake, Newfoundland that agree; also two males and two females from the White Mountains, N. H., July (Morrison). The abdomen in all is only a little darker above than below. From above the genitalia of the female show a median transverse plate in which is a median semicircular notch ending in a black tooth each side; above it is an elongate blunt process each side which scarcely extends beyond the plate (see Figs. 34 and 37).

The type of *H. amicus* Hagen is a female from New Orleans. The tip of abdomen shows a large transverse, somewhat elliptical cavity, (Fig. 36), the lower edge of which has a pair of submedian processes, no black-pointed teeth as in *indistinctus;* the upper edge of the cavity is nearly evenly concave, the lower lateral appendages have the lower tip black, seen from within, and in some specimens these protrude laterally.

Two other females are from Manumuskin, N. J., 8 October, and from Kingston, R. I., 6 September (Barlow); these are the same, and of same size, larger than *indistinctus.* In the three the abdomen is dark brown to black above, contrasting with the yellow venter. Besides these I have taken two females here (Holliston, Mass.) which are smaller and the genital parts, while on the plan of *H. indistinctus,* are different.

Hylepsyche fraternus spec. nov.

Fig. 33

In general, similar to *H. indistinctus,* but the vertex is a reddish brown, the abdomen above black, the margin of each segment pale; the fore wings have the brown streak along lower edge of the second fork as in *indistinctus,* but the entire area behind the upper medius is more uniformly brown, the hyaline along cubitus restricted to basal part.

From above the genitalia (Fig. 33) show the transverse plate, with

a narrow median incision ending each side in a broader black ridge, the two not one-half as far apart as in *indistinctus;* above are the pale elongate projections, each one at tip more slender and black, and projecting beyond the plate below, so that when viewed from below one sees these two projections as prominent black spines, while in *indistinctus* from below one sees the black-pointed sub-median teeth of the transverse plate.

Length of fore wing 10 to 10.5 mm.

Two females from Holliston, Mass., 14 August, and 10 September. Type M.C.Z. No. 25802.

Ross has described another species, *H. plectrus,* from two males; the one here is from Prairie du Sac, Wisconsin. It is a larger species, and the male genitalia differ from those of *H. indistinctus;* from the locality there is little chance that it is the male of *H. amicus.*

Stenophylax antennatus Bks.

Figs. 41, 50

Described from a male from Mt. Rainier. I have another male from Wallace, Idaho, 12 June (Huellemann). In this one the fore wings are more plainly marked, many small blackish irrorations, giving salt and pepper appearance to the wing. Seen from above the intermediate appendages are very slender and slightly divergent at tip; the penis is simple, half-way out its upper part ends in a dark crescentic lobe, and here from each side arises a long, stout, and slightly upcurved black spine; the tip of penis is bilobed. In the fore wing the anastomosis is before the end of the subcosta. In the hind wing the radius and subcosta lie side by side until near tip.

Drusinus frontalis spec. nov.

Figs. 28, 29

♀ Fore wings uniform dark brown, about as dark as in *D. edwardsi,* costal and anal areas rather darker; hind wings smoky, but darker near costal tip; in fore wing are hyaline white spots on arculus and thyridium, a small circular white dot in base of fork two, and another behind thyridium, and a few fainter pale spots, mostly in apical part of wing. Head black, but face pale yellowish, also palpi; antennae black, crenulate below; thorax black above, with black hair and

bristles, pleura more yellowish; abdomen yellowish. Coxae and femora of legs yellowish, also basal third of hind tibia, elsewhere jet black.

Structure much like *edwardsi* and *atripennis*. Fore wings very minutely granulate, each granule tipped by an erect black hair; radius strongly bent before stigma, which is darker than rest of wing; discal cell fully twice as long as pedicel; fork one scarcely back on discal cell, fork three acute at base and slightly pedicellate. In hind wing subcosta and radius separated; forks one and three acute at base and pedicellate. Legs rather slender; spurs 1–3–3; on hind tibia one or two spines before middle, two before apical spurs. Tip of abdomen with two short sub-triangular divergent plates; on venter the parts in depression have the lateral pieces much narrowed at tip, the median piece broad and truncate.

Length of fore wing 16 mm.

One female from Thornhill Mt., 5000 ft., Terrace, British Columbia (Mrs. Hippisley). Type M.C.Z. No. 25839. Readily separated from *edwardsi* and *atripennis* by the very pale face and black apical parts of legs.

We have no species closely congeneric with the type of Anisogamus, and *edwardsi* and *atripennis* are better in Drusinus.

Philocasca

Ross (Trans. Amer. Ent. Soc., LXVII, 111, 1941) makes this new genus for a new species, *demita*, said to differ from Anisogamus by the fused condition of the subcosta and radius in hind wing. However, in the genotype of Anisogamus (*difformis*) these veins are also fused, except near tip. In fact the same condition exists in many related genera, Phacopteryx, Ecclisopteryx, Anisitella, some species of Drusus and even in some Halesus in at least the male. In many other genera, Peltostomis, Acrophylax, Asynarchus, some Stenophylax, etc., the subcosta and radius touch each other most of the distance. Ross also mentions the broad fore wings and the expanded anal field of the hind wings which would indicate that Philocasca was close, possibly identical with Phacopteryx; a female from Oregon, which may be *demita*, agrees very well with Phacopteryx.

None of our caddice flies, as far as I know, are closely congeneric with *Anisogamus difformis*, which has a short-winged female, although other species (*aequalis*) have long-winged females.

However, our *Anisogamus costalis*, A. *disjunctus*, and a new species do have much resemblance to Anisogamus and in males, and usually

in females, have the subcosta and radius of hind wings fused for some distance. They have, however, another venational peculiarity, not present in allied European forms, a peculiarity which was used by Ulmer to make the genus Astenophylax.

Clostoeca gen. nov.

A Limnephilid related to Anisogamus; spurs 1–3–4; no spines under last joint of hind tarsi; two spines before apical spurs; no ocellar macrochaetae; wings of both sexes equally long; in fore wing the costal margin only slightly convex; radius much bent before stigma; anastomosis at or a little beyond end of the subcosta; discal cell but little longer than pedicel; membrane not or scarcely granulate.

In hind wing the subcosta and radius fused for some distance, at least in male, separating before end of the discal cell, and before tip again uniting or connected by a minute cross-vein; anal area not enlarged.

Genotype *C. sperryae* sp. nov. Also includes *Asynarchus costalis* and *Anisogamus disjunctus*.

Clostoeca sperryae spec. nov.

Figs. 1, 4, 5

Face, palpi, and antennae dull yellowish, basal joint of antennae rather brownish above, and beyond many joints are slightly darkened at tip, in male very distinctly so; vertex reddish brown, with some white macrochaetae; thorax above also reddish brown to black, with white macrochaetae, and some black bristles in front of wingbase; pleura and legs dull yellowish, spines black, front tibia spined to base, hind tibia with about two spines before middle, spurs 1, 3, 4; abdomen dull brown; fore wings mostly light brown, with hyaline-white spots, at base of third, fourth, and fifth apical cells (in male not in fourth), sixth apical cell plainly paler toward tip; first and second apical cells not so dark brown, especially toward base; anastomosis dark brown and bordered with dark; two hyaline-white spots in median area, one just before the anastomosis, the second some distance before last, and connected to a larger spot behind in cubital area; a small pale spot over the arculus, and pale behind base of stigma, latter darker than rest of wing. Venation very similar to *disjunctus*, the lower cubitus not extending direct to outer margin, but connected by a short cross-vein

to the vein above it; discal cell not quite as long as pedicel; radius bent at base of stigma; fork one back a short distance on discal cell, fork two indents the anastomosis slightly, fork three scarcely before the anastomosis.

In hind wing the base of discal cell is plainly before the forking of medius.

The last dorsal segment of abdomen projects broadly over the genitalia, the clasper is slender, elongate, straight, seen from above incurved, and below it the penis, with a stout, curved sheath each side ending in two points.

Expanse ♀ 16 mm., ♂ 12 mm.

From Dunsmuir, Calif., 23 May (G. H. and J. L. Sperry), Type M.C.Z. No. 25821.

Very similar to *C. disjunctus*, but in that species the wing is paler and no hyaline spots except the thyridium and arculus.

Chilostigma areolaris Walk.

Figs. 14, 21

One male from Ft. McMurray, Alta, 19 Aug. (Harper coll.). The markings of the fore wing are closely similar to the type. The second joint of male palpus is as long as the third, the latter plainly a little enlarged toward tip; the vertex has a median raised area; there is a macrochaeta a little behind and inward of each ocellus; the posterior warts are broad and a little curved. The genitalia from below show a pair of stout incurved processes, the upper end of which is bent backward, and seen from side; from above there are a pair of elbowed, rather long, tapering processes crossing each other before tips.

Neophylax slossonae spec. nov.

Figs. 8, 9, 10, 13

Head, thorax, legs, and wings pale yellowish; abdomen dull blackish above, pale beneath; head and thorax above with long pale bristles. Fore wings marked with pale brown leaving a pale, slightly yellowish, interrupted streak along hind margin much as in *concinnus;* apical margin also bisinuate almost as strongly as in *concinnus;* in fourth apical cell at margin is a hyaline white spot with marginal white hair, and in fifth and sixth apical cells is a united hyaline white spot with snow-white hair; obliquely through the apical cells somewhat parallel

to outer margin is a row of nearly connected hyaline spots; in middle of wing the brown is mostly in bands; hind wings very pale.

The male genitalia have the superior plate much as in *concinnus*, but below each side (if viewed obliquely) are two large triangular black teeth, just touching at tip; from below they appear as two elongate dark bodies, the lower the longer, behind the lower margin is a large concave area; spine on venter is longer than in *concinnus*.

Length of fore wing 10 mm.

A male from Franconia, N. H. (Mrs. Slosson), Type M.C.Z. No. 25841.

Neophylax delicatus spec. nov.

Figs. 22, 23

Head, thorax, legs, and antennae pale yellowish, abdomen brown above, dull yellowish beneath; head and thorax above with white hair and bristles. Fore wings pale yellowish, apical part and basal part in front of cubitus irrorate with pale brownish bands, tip of wing dark; a brown streak from cubitus behind, broken by a pale, more whitish than yellowish, marginal streak interrupted before the middle, not pale beyond arculus; outer marginal fringe partly snow-white and partly brown. Hind wings pale whitish, veins and fringe pale.

In hind wings there is no closed discal cell, the lower branch extending back and ending on radius a little before radial sector (as in *mitchelli*, *fuscus*, *ayamus*, *sinuatus*, and *pilosus*).

The male genitalia from below show a large subtriangular piece almost to a point in front, the clasper each side ends (when seen from behind) in a long fine dark claw or spine, but seen obliquely from the side there is an upper inner black point and below another dark tooth. From side the superior appendages appear much as in *mitchelli* (Fig. 20)

Length fore wing 7.5 mm.

A male from Delaware Water Gap, 1 Oct. (Mrs. A. T. Slosson), Type M.C.Z. No. 25842.

Structurally related to *N. mitchelli* but differing much in markings of wing as well as in details of genitalia.

Phanocelia gen. nov.

Apatania canadensis Bks. does not belong to the Apatania section since there are two black spines before the pair of apical spurs of hind tibiae. The size and general appearance is much like Apatania,

and the basal joints of antennae as long; however, there is no cross-vein at base of stigma, but the base is much narrowed; the general surface of wing is not granulate, and hair sparse and short. The wing is broader apically than in Apatania, and the fifth apical cell has a pedicel nearly one-half the length of cell. It will come near to Algonquina, but the stigma is more prominent, the wing proportionally wider, and the fifth apical cell long pedicellate.

I, therefore, propose a new genus Phanocelia, with *Apatania canadensis* Bks. as genotype.

Both Milne and Ross have placed it in Glyphopsyche, but it is not related to that section of the family.

Apatania pictula spec. nov.

Figs. 3, 6

Head nearly black, with long snow-white hairs and bristles; thorax above also dark with similar snow-white hairs; abdomen dark brown above, below much paler, some long pale bristles near tip, genitalia pale yellowish; legs pale yellowish, spines black; antennae dark brown to black, with very short white hair below.

Fore wings marked with hyaline and brown, some of the hyaline is nearly white; the stigma, a border behind, and the costal area before are brown; apical margin rather broadly and irregularly pale brown, several cells with a pale spot on outer margin; anastomosis black, and bordered with dark, beyond all cells are hyaline for a short distance, then behind the stigma the apical veins are bordered with dark for a short distance tending to form a curved dark band; in some of upper cells the hyaline extends as a line between the dark; beyond this band and before the apical brown the cells are again hyaline about as far back as cubitus; discal cell mostly pale, and also area before it, toward base is a long dark streak behind cubitus, and toward tip the cubitus is heavily bordered with dark, reaching obliquely down to hind margin of wing.

Hind wings slightly smoky, the veins near tip somewhat bordered with dark.

Venation much like *A. stigmatella*, but the fifth apical cell reaches back before the anastomosis, and the discal cell is a little longer. On the hind tibia near tip before the apical spurs is the usual one black spine.

The genitalia from above show a slender curved cercus each side,

its tip dark, and below is a large body, the tip narrowed to a nearly square piece where there is a short upright hook or curved spine.

Fore wings 9 mm. long.

One male from Greer, Arizona, 11 June (G. H. and J. L. Sperry), Type M.C.Z No. 25820.

Readily known by its maculate wing.

It may here be noted that the species of Apatania and closely related genera have but one spine before the apical spurs on hind tibiae, while in most Limnephilidae there are two spines at base of the spurs. Several other genera also have but one spine at base of the apical spurs on hind tibia. Neophylax and Oligophlebodes go here, also Ecclisomyia and Acronopsyche. It is not a matter of size; the tiny *Psilopteryx brevipennis* has two, Algonquina and Apolopsyche have two, although some of their species are only one-half as large as some Neophylax and Ecclisomyia. These genera also have a frenulum.

Notes on Dicosmoecus

Milne, in Studies in Trichoptera, 2, 1935, using length of fore wings and color of feet, reduced the seven then known names in Dicosmoecus to three species. In the paper by Ross on the Lectotypes of Trichoptera in the Museum of Comparative Zoölogy, 1938, he reduces the seven names to two species and gives figures for each. In this paper he does not state what figures were made from the lectotypes and which from specimens in his own collection and compared with the lectotypes. He gives a figure which is supposed to be that of both *atripes* and *gilvipes* although he made no preparation of the lectotype of either. He also gives figures of "*unicolor*", although *unicolor* was based on a unique female. He made preparations of the lectotype of *tristis* and of *quadrinotatus*, but did not publish a figure; these are quite different from the figure of the lectotype of the supposed male of "*unicolor*."

A brief examination of the preparations of male genitalia, as well as the external parts, convinced me that the treatment of Dicosmoecus by both Milne and Ross fails to represent the situation. I have had more than twice as many specimens. Dr. Betten loaned me preparations of the specimens he had, Dr. Milne loaned me his figures, the Academy of Natural Sciences of Philadelphia loaned a most useful series, and Mr. D. Denning, who precipitated the inquiry by sending a male for identification, kindly loaned the specimen for study. Dr. F. M. Carpenter and Mr. Carl Parsons kindly made several preparations for me.

There is, of course, much more to be learned about the species of Dicosmoecus, but I have tried to present the facts and what I consider the correct interpretation.

McLachlan based his genus Dicosmoecus on *D. palatus*, a Siberian species; this is a dark-winged form much like our *D. obscuripennis*. In examining our species I have noticed that there are two groups, the dark-winged and the yellowish-winged forms. In the true Dicosmoecus the basal part of the clasper, seen from the side, has the upper and lower edges parallel, and the apical part is greatly enlarged toward base and is attached to the full width of the basal part (figs. 91, 93). In the species with yellowish wings the basal part tapers toward its tip, and the apical part is only a little enlarged to hinge to the basal part (fig. 92). From behind one sees in the typical Dicosmoecus that the base of the clasper has a tooth or process above, while in the yellowish species there is no such process.

In the fore wings the anal cell in the yellowish forms has a slender tip which reaches nearly one half-way to the arculus, while in the true Dicosmoecus the anal cell has no such slender tip and falls far short of reaching one-half way to arculus; likewise the bases of the second and fourth apical cells are not in the same positions.

I consider the yellowish forms to represent a new subgenus:

Onocosmoecus subgen. nov.

Genotype: *Dicosmoecus tristis* Banks. In 1913 Martynov described a new genus, Praecosmoecus, from Kamtschatka based on a female specimen. His figure of the fore wing shows that fork one reaches back a long way on the discal cell; thus it is quite different from our forms.

The three genera and two subgenera can be separated as follows:

1. In fore wings fork one extends back a long way on the discal cell. *Praecosmoecus*

   In fore wings fork one scarcely goes back at all on the discal cell. 2

2. Front tibiae not spined to base; fore wings more pointed at tip; no large two-jointed claspers . . . . . *Allocosmoecus*

   Front tibiae spined to base; fore wings not pointed at tip; in male a pair of large two-jointed claspers . . . . . *Dicosmoecus* 3

3. Wings not yellowish; rarely with a black dot in base of second fork or behind thyridium; anal cell comparatively short and without a slender tip; base of fourth apical cell is fully as far out as the base of second apical cell. In male the apical part of clasper is greatly

enlarged toward base; in the female the tip of abdomen ends in two divergent flaps or plates.....subgenus *Dicosmoecus*
Wings yellowish; a distinct black dot in base of fork two and another behind thyridium; the anal cell has a long and slender tip which reaches almost one-half way to the arculus; base of fourth apical cell is not as far out as base of second apical cell. In the male the apical part of clasper is but little enlarged at base, and seen from side hardly more than one-half the greatest breadth of basal part; in the female the abdomen ends in two pieces pressed together to form a tapering tube.....subgenus *Onocosmoecus*

Dicosmoecus atripes Hag.

Figs, 98, 100, 101, 117, 135

Mature specimens have the tarsi and part of tibiae black; in teneral specimens these parts are more or less pale. The superior appendages are very slender, the inferior appendages, seen from below, have the inner corner rounded, and more laterally is a sharp point. (Fig. 98.)

The penis sheath is short and with seven long spines, five close together on the outer end, and two nearer to the penis. (Figs. 100, 101.)

Tip of abdomen of female shows two somewhat fusiform plates (Fig. 135).

Hagen described *atripes* from Colorado Mts., August (Lieut. Carpenter); others before me are from Lake County, Colo.; South Park, Colo., 17 August (Oslar); Sapello Canon, New Mexico (Oslar); Yellowstone (Hayden Survey); Beaver Creek, Alta., 26 August (Carr); Deer Creek, Provo, Utah, 21 22 August, 1 September (Tom Spalding); Manitou, Colo., 18 July, (H. Skinner); Beulah, N. Mex. 17 August (H. Skinner).

Dicosmoecus jucundus spec. nov.

Figs. 102, 108, 118

This is very similar in wings, legs, and general appearance to *atripes*, and externally there is little difference in genitalia; the apical part of clasper is not quite as long as in *atripes*, and, seen from side, a little more curved downward.

The flaps at the tip of abdomen of female are not as pointed as in *atripes*, but with a broadly rounded tip, and are not quite as long as those of *atripes*.

The penis-sheath (Fig. 102) has seven long spines as in *atripes*, but differently grouped; two rather shorter ones are together near base, a little beyond a group of three long ones, still further out is another long one, and at the end of the very slender tip of the lobe there is another long and very slender spine. It is of the same size as *atripes*, and perhaps but a variety.

The specimens are from Modoc Co., in the northeastern part of California, 29 July, 1 August (Lindsey coll.) Type M.C.Z. No. 25887; also from Upper Salmon River, mouth of Smiley Creek, Idaho, 16 August; Strawberry Creek, Strawberry Mts., Oregon, 20 August; and Wild Horse Canyon, Steens Mts., Oregon, 1 Sept. (Acad. Nat. Sci. Phila.)

Dicosmoecus nigrescens spec. nov.

Figs. 88, 90, 93, 96

This is related to *atripes*, the clasper having no small curved spine on inner carina as noted in *gilvipes*. The tibiae largely, and tarsi wholly, black. Fore wings have the veins and anastomosis deep black, and rather broadly bordered with black, much as in *partitus*, a white spot at thyridium; hind wings smoky, the veins black and bordered, especially toward tip of wing. The genitalia are similar to *atripes*, the basal enlargement of clasper is rounded on inner edge and only laterally is there a small tooth as in *atripes*, none on inner edge; the apical part of clasper fully as long as in *atripes;* the superior appendages, however are nearly twice as broad as in *atripes*. The sheath of penis differs strikingly from all other species; each lobe has two rows of the long spines, grouped differently and more numerous than in either *atripes* or *jucundus*, (Fig. 88). The divergent plates at tip of the female are more slender and tapering than in *atripes*.

Length fore wing 23 to 24 mm.

Two males from Richel Lodge, Montana, 8, 12, August, and female from Moran, Wyoming, (G. H. and J. L. Sperry). Type M.C.Z. No. 25830.

Dicosmoecus pallicornis spec. nov.

Figs. 82, 83, 86, 87

In general related to *atripes*, no pale spot in costal area near stigma, and the claspers, viewed from behind do not show an inner spine seen in the *gilvipes* group. The antennae are wholly fulvous, the tarsi pale,

scarcely at all darkened. In fore wings the veins are pale, forks one and two indent the anastomosis more than in other species, the membrane densely clothed with more yellowish hair than in *atripes*, and toward base distinctly golden. The hair on vertex and pronotum almost wholly yellowish, the antennae crenulate below as in others, size of *atripes*. The superior appendages are more slender than those of *atripes;* the apical part of the clasper longer than in *atripes* and less curved, the lower appendages, seen from below, show the lobe nearer to base than in *atripes*.

The sheath of penis does not project laterally, and at tip has several small black spines, and a few much smaller hyaline ones each side, sometimes rubbed off.

A male from Placer Co., California, Sept. Type M.C.Z. No. 25829; paratype from Round Valley, Inyo Co., California, October 15 to 30, in Dr. Betten's collection; also Inyo Co., California, October 1 (Acad. Nat Sci. Phila.).

Dicosmoecus gilvipes Hagen

Figs. 89, 99, 107, 110, 111

The tarsi are yellowish to rufous; the base of wing is usually pale, but sometimes the veins darkened, many of the short hairs silvery. The superior appendages are much broader than in *atripes*, the claspers have their ventral end enlarged into a triangular point, and laterally where the edge is deeply concave one can see a short spine-like process or hook on the inner ridge (fig. 94) not present in *atripes*. The very long penis-sheath has a row of large almost scale-like spines (fig. 89). It can be readily recognized by the white costal spot above end of anastomosis, which is also present in the dark form, *D. grandis*. The tip of abdomen of female has short, broad, and pointed plates.

Types from Quesnel Lake, Brit. Columbia, 27 August (G. R. Crotch); others from Penicton, B. C., 21 September (Downes); Arrowhead Lake, B. C.; Wellington, B. C. (Bryant); Cultus Lake, B. C., 29, 30 September, 15 October; Reno, Nevada, 27 August (Hillman), Wallace, Idaho, 5 October (Huellemann); Cala. (Acad. Nat. Sci. Philad.).

Dicosmoecus grandis Ulmer

Figs. 85, 95

This is a very dark form of D. *gilvipes*, the genitalia being the same, or almost so; the fore wings have black veins bordered with black,

leaving only very slender pale areas, the base of wings not pale as in types of *D. gilvipes.* On the costa just above end of anastomosis is a hyaline white spot, and a similar larger spot on the thyridium, contrasting strongly with the rest of the wing. The legs are rufous, but the hind tibia, particularly in female, are dark on apical half.

The genitalia of male are about the same as in *gilvipes;* each lobe of the penis sheath is clothed with a row of scales, much as in *gilvipes.* The tip of abdomen of the female has two broad and almost pointed plates (Fig. 95).

The type is from Olympia, Washington; I have seen others from Oregon as follows: Bull Run Cr., (Trib. Fall Cr.) 14 October; McKenzie Bridge, 12 Oct.; and Mahama, 25 Oct. (D. C. Mote). This is, doubtless, best treated as a color variety of *gilvipes.*

Dicosmoecus obscuripennis Bks.

Figs. 97, 106, 114

Palpi brown, not paler at tips; hair on vertex partly rufous. Fore wings uniform brown, with black dot in base of second fork, and one behind the thyridium, latter and arculus hyaline; membrane and veins with much, largely erect, black hair, very few minute pale hairs. Hind wings nearly evenly brownish, the costal area darker, a black dot in base of fork two. In fore wing the base of fourth apical cell is about as far out as base of the second apical cell; anal cell has slender tip and reaches nearly one-half way to arculus; the medius forks closer to base of wing than in most of the other species, otherwise venation like allies.

Legs pale, unmarked; superior appendages slender; clasper with slender, apical part, slightly curved inwards, lower base with slight enlargement.

The sheath is very slender and at base has one short but fairly stout spine, at tip are two spines close together, between are two very slender curved hardly noticeable spines.

This is very similar to the genotype, *D. palatus* of Siberia, but with darker wings, the apical part of clasper slightly longer; in *palatus* the tips of palpi are plainly pale, and hair on head black.

D. obscuripennis is known only from Alaska.

Dicosmoecus (Onocosmoecus) unicolor Bks.

Figs. 103, 126, 127

Besides the type from Snokomish River, Washington, I have females from Saltese, Montana, 22 August, and Banff, Alberta, 13 August.

Both are of the same size and like the type show a faint dark mark over the dot in fork two, and another around the thyridium; the dark dot behind thyridium is scarcely noticeable. The sheath of the ovipositor is plainly longer than in *occidentis* and at the widened part near base there is a minute tooth each side.

A male from Banff (Betten coll.) and another from Alaska may be males of this species; it differs from *occidentis* in that the third and fourth spines of the sheath are not widely separated (figs. 126, 127).

Most of the records under the name of "*unicolor*" undoubtedly are referable to other species.

Dicosmoecus (Onocosmoecus) occidentis spec. nov.

Figs, 104, 116, 124, 125, 128, 132, 136

This is a pale yellowish species with the dark dots in base of fork two and behind thyridium distinct, and around each is a pale brown cloud, that near the thyridium usually extending toward discal cell, all much as in *coloradensis*. Venation is similar to related forms. The male genitalia have the superior appendages broad toward tip and scarcely narrowed toward base; the superior plate is much broadened toward base, and divided by a median line to basal fourth. The claspers have the apical part tapering from base to the sharp-pointed incurved tip.

The apical part of penis-sheath is provided with four spines (only two in *coloradensis*), the basal one extremely long and reaching tip of sheath, the next about one-half as long, the third about one-half of second, and the last is placed much beyond the third, quite short, and its tip hardly reaching the tip of sheath.

In the female the apical appendages are short, much shorter than in *unicolor*, and do not show the tooth each side, the tips slightly divergent; beneath the cavity on eighth segment shows the three little processes, the middle one without a groove or division.

Length of fore wing, ♂ 15 to 16 mm., ♀ 16 to 18 mm.

Holotype from Wallace, Idaho, 1 October (Huelleman); paratypes from Wallace, Idaho, 31 August; Ft. Resolution, British America (Kennicott); Great Slave Lake, Hudson Bay Terr. (Kennicott); Fernie, Brit. Columbia, 29 August; Cultus Lake, Brit. Columbia, 25, 29, 30 September, 28 October; Wellington, Brit. Columbia, 29 August (T. Bryant), Bozeman, Mont. 12, 13 August. Type M.C.Z. No. 25832. Paratypes M.C.Z. and Univ. Minn. Mus.

Dicosmoecus (Onocosmoecus) alascensis spec. nov.

Figs. 105, 123, 129.

Wings pale yellowish; the dark dots of fore wing distinct; there is a faint dark shade up from the thyridium, and another just beyond the anastomosis, leaving the apical third of discal and median cells clear; posterior part of wing brownish; the dark portions usually show some faint whitish or hyaline spots. From the side the apical part of clasper is slender and strongly curved downward, the superior plate is deeply indented about as in allies, the superior appendages are more narrowed toward base than in *coloradensis*. The lower appendages seen from below have a very slight lobe toward base, the apical part of clasper tapers rather rapidly to a slender sickle-shaped tip.

The penis-sheath has four spines at about equal distances apart; the one near tip short, the next longer, the one before that still somewhat longer, but not reaching tip of the one beyond, the fourth is very large and long and extends fully to tip of the sheath.

Length of fore wing 14 mm.

Two from Idatarod, Alaska, 29 July, 1 August. Type M.C.Z. No. 25831.

Dicosmoecus (Onocosmoecus) tristis Bks.

Figs. 109, 115, 119, 138

The fore wings show the dark dot in base of fork two, but the one behind thyridium is faint or absent, and there are no dark surrounding clouds seen in *coloradensis*. In the female the ovipositor sheath has a small but distinct tooth each side before it narrows, and the tips do not recurve as in the other species.

The superior appendages of the male are not so much broadened as in *occidentis* and *quadrinotatus;* the superior plate divided to basal third; the sheath has five spines, the basal one very long, much as in *occidentis*, the second arises close to base of first, but much smaller, the next two rather close together, one-half as long as first, the last its length beyond the fourth, but hardly as far from tip of sheath.

The types are from South Park, Colorado, 17, 20, 25 August (Oslar).

Dicosmoecus (Onocosmoecus) quadrinotatus Bks.

Figs. 113, 120, 121, 134

The uniformly brownish fore wings of the male separates this form from all except *D. obscuripennis* which is still darker, and has smaller

superior appendages. Both dark dots are prominent in the fore wings, and also in the female in which the wings are not as dark. The sheath of the ovipositor is scarcely longer than in *occidentis*, and there is no tooth each side near base; of the three processes on the venter the middle is broad, and without median groove, the lateral pieces lean toward each other beyond the middle piece.

Like *tristis* the penis-sheath has five spines toward tip, but the basal one is not so much longer than the others, and does not reach to tip of sheath; the three nearest tip are moderately short and very stout, the last reaches beyond the tip of sheath; in one specimen the usual pair at apex of inner part of sheath appear to come from the outer part, but do not.

The type is from Grand Lake, Newfoundland, 28 July, others from Baddeck, Cape Breton, Nova Scotia, 12 August (Fairchild), White Mts., N. H. (Morrison), Randolph, N. H. 23 August, 1 September (G. H. & J. L. Sperry).

Dicosmoecus (Onocosmoecus) coloradensis Ulmer

Figs. 122, 130, 131, 133

This species is very similar to *D. tristis*, of the same size and shape of fore wings. The black dots are very distinct and each surrounded by a dark area; the dark around the thyridial dot extends across discal cell. In *tristis* the thyridial dot is scarcely evident, and no dark cloud. The venation is the same as in *tristis*. The male external genital parts are also similar to *tristis;* the superior appendages are smaller; the base of clasper (seen from behind) shows one or two small teeth as in *tristis*.

The armature of the sheath is entirely different; in *coloradensis* with two short spines as figured by Ross (Lectotypes, fig. 48), while *tristis* has five spines on each lobe of the sheath.

In the female (which is scarcely larger than the male) the terminal sheath (seen from side) is more slender than in *tristis*.

It was described from Colorado and Mr. Denning loaned a male taken by Prof. Mickel at Ward, Colorado, 16 August, 1940. Ross's specimen was from Inyo Co., California.

The Academy of Natural Sciences of Philadelphia has specimens from Inyo Co., California; Wild Horse Canon, Steens Mt., Oregon, 1 Sept., 4225 to 4400 (Rehn and Hebard); Strawberry Creek, Strawberry Mts., Oregon, 20 August, 4450 ft. (Rehn and Hebard); Upper Salmon River, mouth of Smiley Creek, Idaho, 16 August, 7200 ft. (Rehn and Hebard).

They are very much smaller than *D. unicolor*, much paler, and the fore wing proportionally broader at stigma; the shape of the terminal appendages of the female also different.

I consider it to be *coloradensis* since Ulmer refers to the dark clouds around the black dots, and also to two points on penis sheath; in *tristis* one would see more than two at the tip if any.

Allocosmoecus gen. nov.

In general appearance similar to the large black-veins species of Dicosmoecus; palpi long; antennae crenulate; anal cell rather short; the spurs 1, 2, 2. The fore wings are more slender and more pointed at tip, the venation similar to Dicosmoecus except that the radius is more sinuous just above base of fork one. The front legs are much less spiny than Dicosmoecus, not spined to base, and the spines on front tarsi are very few and short; last joint of hind tarsi without spines.

The male differs prominently in lacking the two-jointed claspers; instead the upper lateral appendages are greatly enlarged, somewhat similar to *Colpotaulius infernalis*.

It differs from the *Colpotaulius* group in lacking the row of black hair by the side of the femoral groove, and the tibial spur is not modified, nor is the pronotum enlarged; in this group it would come nearest to the Indian Astratodina, but besides lacking the femoral row of black hairs, it has crenulate antennae, and fork one is broad at base, not extending back on the discal cell.

Allocosmoecus partitus spec. nov.

Figs. 73, 74, 76

Face yellowish, with some short black hairs, longer pale hairs above; vertex black, posterior warts fulvous, with black hair; antennae black, including basal joint below as well as above; thorax black, the mesonotal strips and the lateral lobes above base of wings, and the pronotal warts pale yellowish, hair partly pale, mostly black; the mesoscutellum and basal median lobe of metanotum pale yellowish, the mesoscutellum with some black but mostly pale hair; abdomen brown above on basal two-thirds, beyond and the venter yellow; pleura almost black, with the usual tufts of long white hair; femora pale yellowish, front and mid tibiae dark on basal half, pale beyond, hind tibiae pale

on basal third, dark beyond; tarsi with basal joint pale, others more or less black.

Fore wings marked as in *Dicosmoecus nigrescens*, but the two large pale areas, one beyond and one before the anastomosis are hyaline, the basal half of all apical cells hyaline, and the discal cell and cells behind to the anal vein also hyaline; thyridium with a snow-white spot; veins black, with short black bristles; the hyaline areas of the membrane with short white hair, the dark parts with short black hair. Hind wings dark beyond anastomosis and along costal area, the anal part evenly smoky; veins black, except the hyaline basal half of first anal vein. Structure similar in many ways with typical Dicosmoecus; the ocelli, however, are plainly more elongate, and hardly as large; the antennae are crenulate below, but not as strongly so; the venation similar, in hind wings the discal cell does not extend so far basad of the fork of medius as in Dicosmoecus, more like the *unicolor* group; the front tibiae are not spined to base, but only a few toward tip; spurs 1, 2, 2.

The genitalia are peculiar; the upper lateral ones are very large, concave within, and spreading; the superior appendages are extremely slender and close together, below there is a pair of prominent thorns, and from below there is a low median lobe with a pair of processes from near middle.

Expanse 52 mm.

One male from Wallace, Idaho, 22 September (Huellemann), Type M.C.Z. No. 25760.

The pale areas of fore wings, the dark basal antennal joint, the dark on front and mid tibiae, the pale yellowish areas on thoracic notum, and the male genitalia all serve to distinguish it.

PHRYGANEIDAE

Banksiola calva spec. nov.

Figs. 61, 68, 69, 70

♂ In markings of fore wings very similar to *B. smithi*, but many of the dark cross-bands in cells are more slender, and in some areas fewer; in the apical part none of the pale spots come close to the margin, and in the hind wings only the dark marks along upper side are present. The middle of mesonotum and metanotum is black or almost so (pale in *smithi*); otherwise the color is as in *smithi*. In venation it is also similar to *smithi*, except that fork one goes back almost directly

opposite the forking of medius (much beyond in *smithi*). In hind wing the anastomosis is more in a straight line (see figure 61) than in *smithi*. The male genitalia shows the claspers much longer and more slender than in *smithi* or other species of the genus. They are curved to form a circle as large as the tip of the abdomen, their tips cross above; there is no tooth on the upper part as in other species, nor a rounded hump near base as in *smithi*, but on the lower inner side there are six or eight slender well-separated spines, and some slight irregular granules. From above, the end of the abdomen shows a transverse pale area, from which arise a number of long stiff bristles, each from a pit. From behind one sees in the middle an elongate triangular piece with the tip below.

Length of fore wing 10 mm.

One male from Medford, Mass. (F. G. Sanborn), Type M.C.Z. No. 25756.

Neuronia childreni Betten, based on a female; if from the Eastern United States or Canada, is probably the female of *Neuronia* (*Oligostomis*) *canadensis* Bks. The black on thorax and vertex, and the dark on basal part of femora, as well as the venation of hind wing agree with *canadensis*. In the females that I have seen the lateral processes at tip of the ventral plate are twice as long as the median pair.

Dasystegia improba var. sackeni var. nov.

Figs. 62, 72

Similar in many ways to typical form. The marks of the fore-wing tend to form spots, separated by pale areas, rather than the more evenly irrorate wings of the typical form. The fore wings are plainly broader than in typical form; holotype of *improba* 5.1 mm. wide, 15 mm. long; holotype of *sackeni* 6.2 mm. wide, 16 mm. long. The upper part of clasper is heavier than in typical form, and the tip of penis is plainly oblique, more nearly truncate in *improba*, the short process each side reaching over part of clasper in *improba* is short and enlarged at tip, in *sackeni* it is longer and not enlarged at tip.

Holotype ♂ from Axton, Adirondack Mts., N. Y., June, (MacGillivray and Houghton); another male from Franconia, N. H. (Mrs. A. T. Slosson); females from Catskill, N. Y., July (Osten Sacken) and White Mts., N. H., Type M.C.Z. No. 25838. The true *improba* with slender wings occurs in northern Maine.

HYDROPSYCHIDAE

Arctopsyche divergens spec. nov.

Figs. 75, 80

In appearance much like *Parapsyche elsis,* but not so much dark along the cubitus, and the marginal dark and pale spots not so contrasting. Venation much like *grandis;* the cross-vein from subcosta to radius about opposite the base of discal cell, the subcosta, however, runs out free to margin, not connected to radius near tip as in *grandis.*

The superior plate ends in two processes as in *almota* (*oregonensis*), but the plate is much broader and the processes are stout, divergent, dark spines; the superior appendages are broad, obliquely truncate at tip and also divergent; below the superior plate there is a pair of dark, upcurved spines; the clasper has a large basal hump, and the lower part tapers to the end where there is a short upright piece; the penis is slender, a little enlarged at tip, the penis-sheath is broad and long and curved downward.

Length of fore wing 14 mm.

One male from Castella, California, 13 June (Grace H. and John L. Sperry). Type M.C.Z. No. 25844.

Arctopsyche inermis spec. nov.

Figs. 79, 84

In general very similar to *A. grandis.* Wings marked about the same, in apex of first apical cell is a round clear spot, and two or three others above it, these are much more distinct than in *grandis,* venation also about the same, the subcosta runs out to the margin without bending down to radius near tip as commonly in *grandis,* the forking of lower branch of medius is more nearly to the forking of the cubitus than usual in *grandis.* The last joint of maxillary palpus is shorter than in *grandis.*

The genitalia are on the plan of *grandis,* but with two prominent differences: the penis has no slender process at tip, and the intermediate appendages are shorter and without the swelling toward tip present in *grandis,* thus more like *ramosa,* the superior appendages are a little broader than in *grandis,* the clasper is much like that of *grandis.*

Length of fore wing 13.5 to 14.5 mm.

Three males from Slate Creek, Blue River Valley, Summit Co., Colorado, 8211 ft., 13 July (S. E. Clagg). Type M.C.Z. No. 25843.

SERICOSTOMATIDAE

Notidobia arizonica spec. nov.

Figs. 94, 112, 137

Body jet black, also front legs and antennae, rest of legs paler, but femora quite dark; vertex and mesonotum with long white hair; each joint of antennae on its inner side with a patch of snow-white hair. Fore wings with black veins and very dark membrane, thickly clothed with long black, and considerable snow-white hair, the latter is most prominent at greatest width of wing where it almost forms a broad band, elsewhere the white is scattered to make a mottled appearance. The hind wings are clothed with short black and yellowish hair, much as in *N. nigricula.* The venation is much as in allied species.

The male genitalia have the clasper much broader than in *N. nigricula* and a little broader than in *N. griseola;* the inner basal hook ends in two black teeth; the penis (seen from above) is deeply angularly notched at tip.

Length of fore wing, male 9.5 mm., female 11 mm.

From Todds Lodge, Oak Creek, Arizona, June 12 to 17 (G. H. and J. L. Sperry). Type M.C.Z. No. 25891.

The color and length of hair on fore wings separate it from *N. nigricula.*

PLATES

PLATE 1

PLATE 1

Fig. 1. *Clostoeca sperryae*, fore wing.
Fig. 2. *Rhadicoleptus sperryi*, fore wing.
Fig. 3. *Apatania pictula*, fore wing.
Fig. 4. *Clostoeca sperryae*, penis from below.
Fig. 5. *Clostoeca sperryae*, genitalia from side.
Fig. 6. *Apatania pictula*, genitalia above.
Fig. 7. *Clostoeca sperryae*, tip of hind wing.
Fig. 8. *Neophylax slossonae*, genitalia from side.
Fig. 9. *Neophylax slossonae*, genitalia from below.
Fig. 10. *Neophylax slossonae*, genitalia obliquely from side.
Fig. 11. *Rhadicoleptus sperryi*, genitalia side.
Fig. 12. *Rhadicoleptus sperryi*, genitalia above.
Fig. 13. *Neophylax slossonae*, genitalia above.
Fig. 14. *Chilostigma areolaris*, genitalia side.
Fig. 15. *Hesperophylax magnus*, superior appendages of female, above.
Fig. 16. *Hesperophylax occidentalis*, female appendage from side.
Fig. 17. *Hesperophylax occidentalis*, female appendage from above.
Fig. 18. *Hesperophylax magnus*, male appendages from side.
Fig. 19. *Hesperophylax magnus*, male appendages from side.
Fig. 20. *Neophylax mitchelli*, genitalia from side.
Fig. 21. *Chilostigma areolaris*, genitalia from above and beneath.
Fig. 22. *Neophylax delicatus*, genitalia from below, and tip of clasper obliquely from side.
Fig. 23. *Neophylax delicatus*, genitalia from side.
Fig. 24. *Hesperophylax incisus*, penis from side.
Fig. 25. *Hesperophylax magnus*, female appendage from side.
Fig. 26. *Hesperophylax incisus*, male appendages from side.
Fig. 27. *Hesperophylax incisus*, female appendages from above.

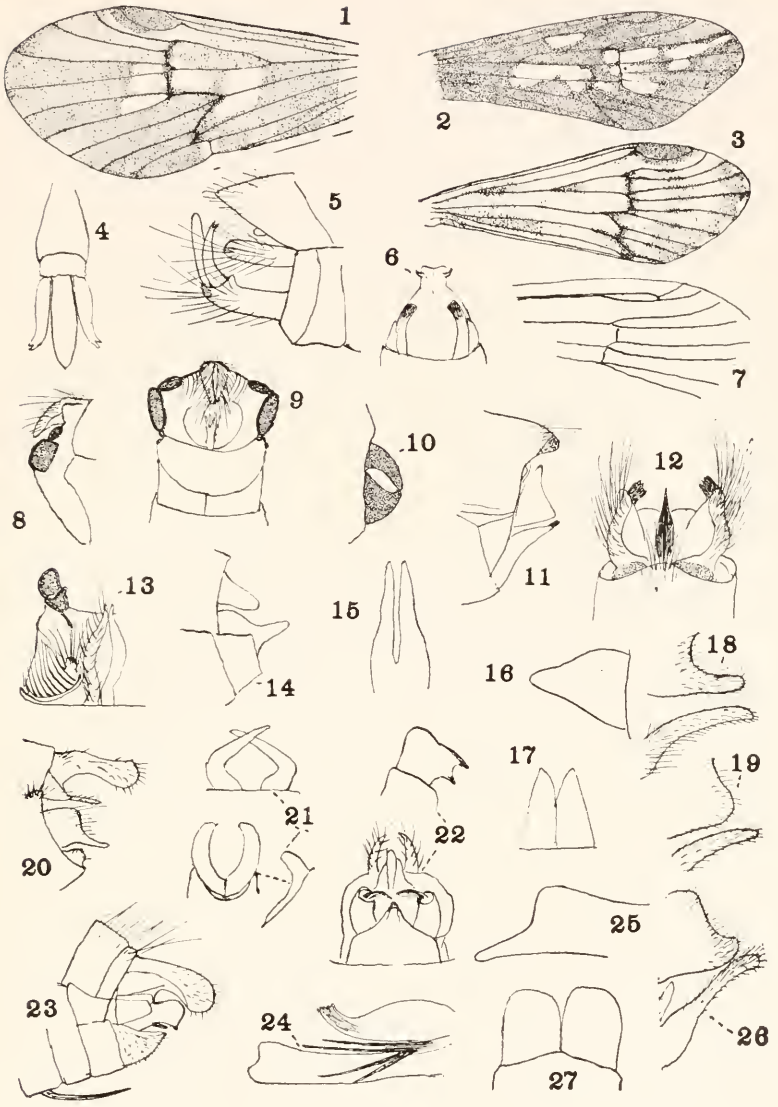
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PLATE 2

PLATE 2

Fig. 28. *Drusinus frontalis*, genitalia from above.
Fig. 29. *Drusinus frontalis*, genitalia from below and side.
Fig. 30. *Pycnopsyche antica*, tip of clasper.
Fig. 31. *Pycnopsyche antica*, cercus from side.
Fig. 32. *Pycnopsyche antica*, penis from side.
Fig. 33. *Hylepsyche fraternus*, female from above.
Fig. 34. *Hylepsyche indistinctus*, female from above.
Fig. 35. *Pycnopsyche perplexa*, male from behind, and penis from below.
Fig. 36. *Hylepsyche amicus*, female from behind.
Fig. 37. *Hylepsyche indistinctus*, female from side.
Fig. 38. *Pycnopsyche minima*, cercus from side.
Fig. 39. *Pycnopsyche minima*, tip of clasper.
Fig. 40. *Clistoronia magnifica*, tip of penis.
Fig. 41. *Stenophylax antennatus*, genitalia from side.
Fig. 42. *Pycnopsyche scabripennis* tip of clasper.
Fig. 43. *Clistoronia magnifica*, male from above.
Fig. 44. *Astenophylax hesperus*, behind and above.
Fig. 45. *Pycnopsyche conspersa*, clasper at tip.
Fig. 46. *Pycnopsyche conspersa*, cercus from side.
Fig. 47. *Clistoronia maculata*, cercus from side, and female from above and side.
Fig. 48. *Clistoronia formosa*, cercus from side, and female from above and side.
Fig. 49. *Clistoronia magnifica*, genitalia from side.
Fig. 50. *Stenophylax antennatus*, genitalia above.

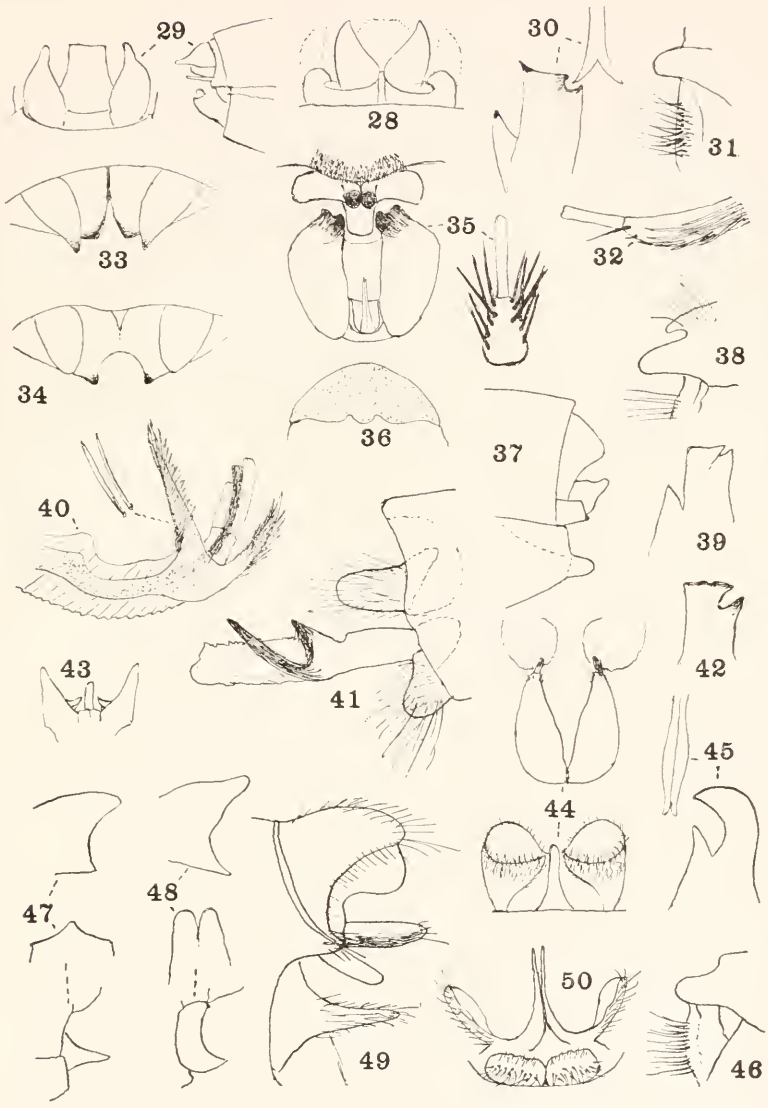
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PLATE 3

PLATE 3

Fig. 51. *Limnephilus americanus*, female from side.
Fig. 52. *Limnephilus americanus*, female from above.
Fig. 53. *Limnephilus hyalinus*, cercus, inner view.
Fig. 54. *Limnephilus hyalinus*, curved process of sheath.
Fig. 55. *Limnephilus adustus*, male from side.
Fig. 56. *Limnephilus adustus*, cercus, seen obliquely.
Fig. 57. *Limnephilus externus*, tip of sheath.
Fig. 58. *Limnephilus flavastellus*, tip of sheath.
Fig. 59. *Limnephilus flavastellus*, cercus from inside and outside.
Fig. 60. *Limnephilus adustus*, penis and sheath.
Fig. 61. *Banksiola calva*, part of hind wing.
Fig. 62. *Dasystegia improba sackeni*, clasper and penis.
Fig. 63. Tip of female of *Limnephilus flavastellus*, left, and *L. externus*, right.
Fig. 64. *Limnephilus externus*, female above.
Fig. 65. *Limnephilus flavastellus*, female above.
Fig. 66. *Limnephilus externus*, cercus from inside and outside.
Fig. 67. *Limnephilus externus*, cercus, of a Wyoming specimen.
Fig. 68. *Banksiola calva*, genitalia from behind.
Fig. 69. *Banksiola calva*, genitalia from side.
Fig. 70. *Banksiola calva*, genitalia from above.
Fig. 71. *Limnephilus flavastellus*, tip of intermediate appendage of male.
Fig. 72. *Dasystegia improba sackeni*, tip of female from above.

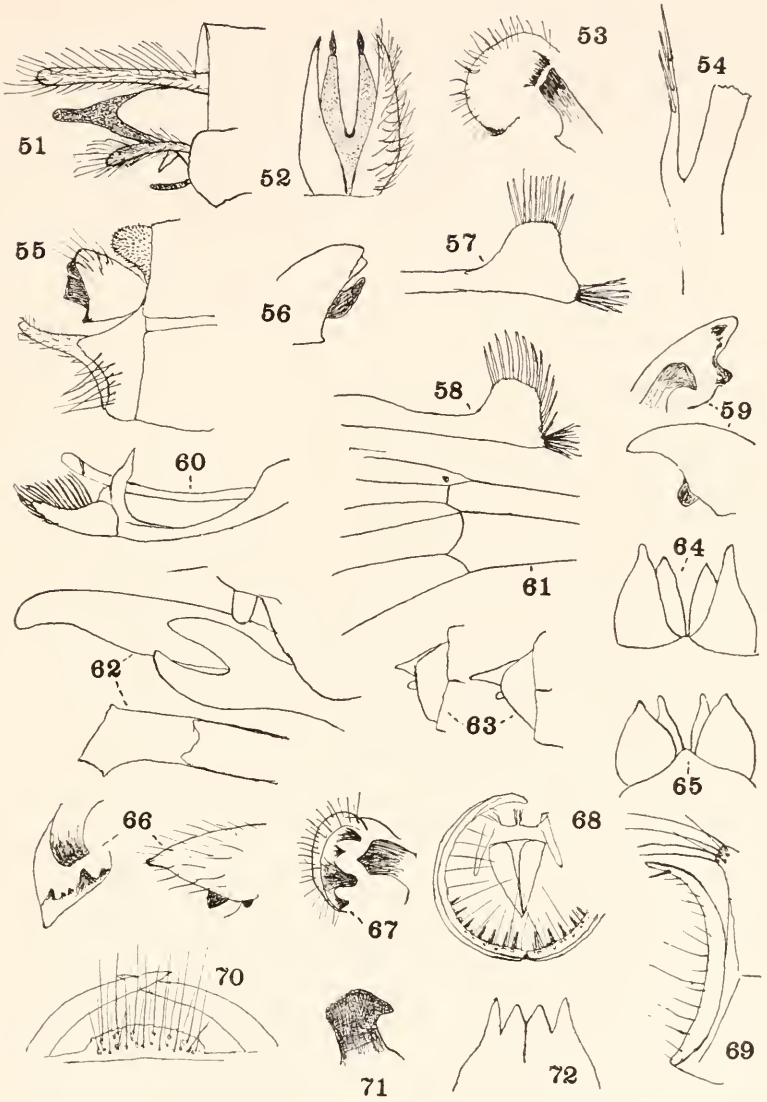
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PLATE 4

PLATE 4

Fig. 73. *Allocosmoecus partitus*, genitalia from below.
Fig. 74. *Allocosmoecus partitus*, genitalia from above.
Fig. 75. *Arctopsyche divergens*, genitalia, above.
Fig. 76. *Allocosmoecus partitus*, genitalia, side.
Fig. 77. *Hesperophylax designatus isolatus*, genitalia, side.
Fig. 78. *Hesperophylax designatus isolatus*, penis and sheath.
Fig. 79. *Arctopsyche inermis*, genitalia from side.
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Fig. 85. *Dicosmoecus grandis*, base of claspers from below.
Fig. 86. *Dicosmoecus pallicornis*, penis, paratype.
Fig. 87. *Dicosmoecus pallicornis*, penis and sheath, type.
Fig. 88. *Dicosmoecus nigrescens*, sheath.
Fig. 89. *Dicosmoecus gilvipes*, sheath.
Fig. 90. *Dicosmoecus nigrescens*, base of claspers from below.
Fig. 91. *Dicosmoecus palatus*, clasper of genotype.
Fig. 92. *Dicosmoecus occidentis*, clasper.
Fig. 93. *Dicosmoecus nigrescens*, clasper.
Fig. 94. *Notidobia arizonica*, clasper from side.
Fig. 95. *Dicosmoecus grandis*, tip of female.
Fig. 96. *Dicosmoecus nigrescens*, cerci from above.

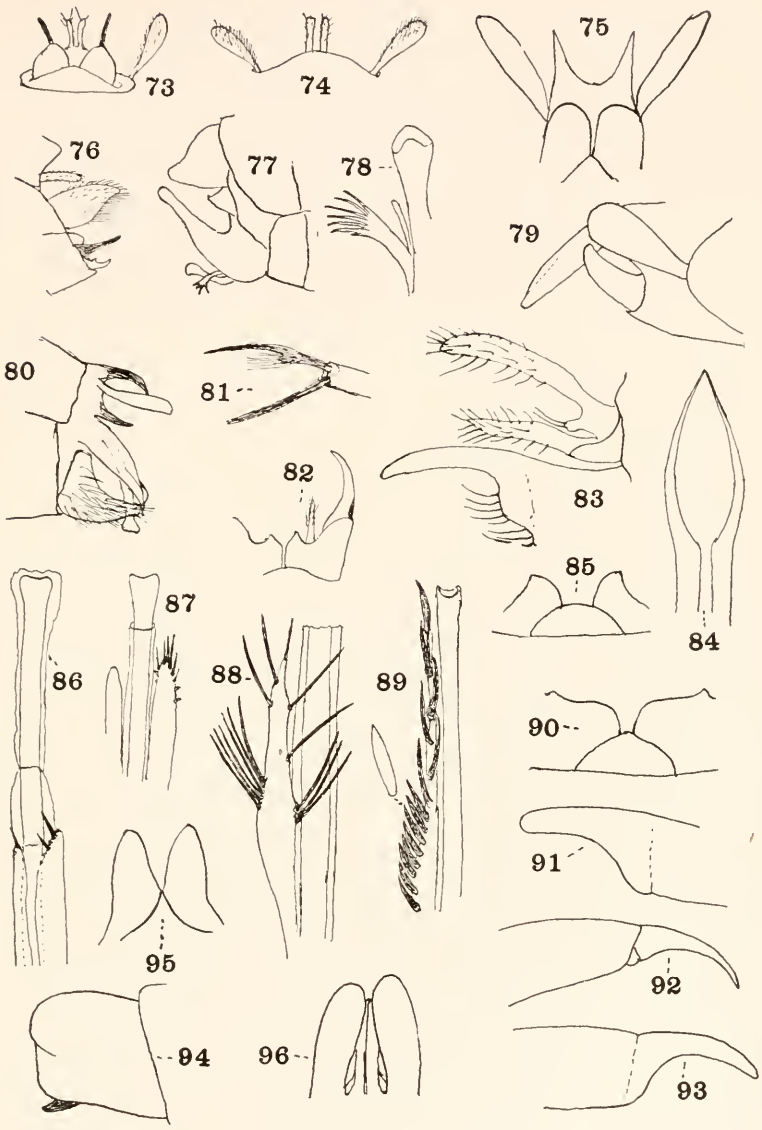
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PLATE 5

PLATE 5

Fig. 97. *Dicosmoecus obscuripennis*, penis and sheath.
Fig. 98. *Dicosmoecus atripes*, base of claspers from below.
Fig. 99. *Dicosmoecus gilvipes*, base of claspers from below.
Fig. 100. *Dicosmoecus atripes*, sheath.
Fig. 101. *Dicosmoecus atripes*, sheath, type.
Fig. 102. *Dicosmoecus jucundus*, penis and sheath.
Fig. 103. *Dicosmoecus unicolor*, female, tip of abdomen.
Fig. 104. *Dicosmoecus occidentis*, female, tip of abdomen.
Fig. 105. *Dicosmoecus alascensis*, superior plate.
Fig. 106. *Dicosmoecus obscuripennis*, appendages from above.
Fig. 107. *Dicosmoecus gilvipes*, female, eighth ventral segment.
Fig. 108. *Dicosmoecus jucundus*, superior plate and cercus.
Fig. 109. *Dicosmoecus tristis*, superior plate and cercus.
Fig. 110. *Dicosmoecus gilvipes*, male palpus.
Fig. 111. *Dicosmoecus gilvipes*, cerci above.
Fig. 112. *Notidobia arizonica*, clasper from within.
Fig. 113. *Dicosmoecus quadrinotatus*, male palpus.
Fig. 114. *Dicosmoecus obscuripennis*, claspers from below.
Fig. 115. *Dicosmoecus tristis*, female, tip from above.
Fig. 116. *Dicosmoecus occidentis*, base of claspers from below.
Fig. 117. *Dicosmoecus atripes*, female, eight ventral segment.
Fig. 118. *Dicosmoecus jucundus*, base of claspers from below.

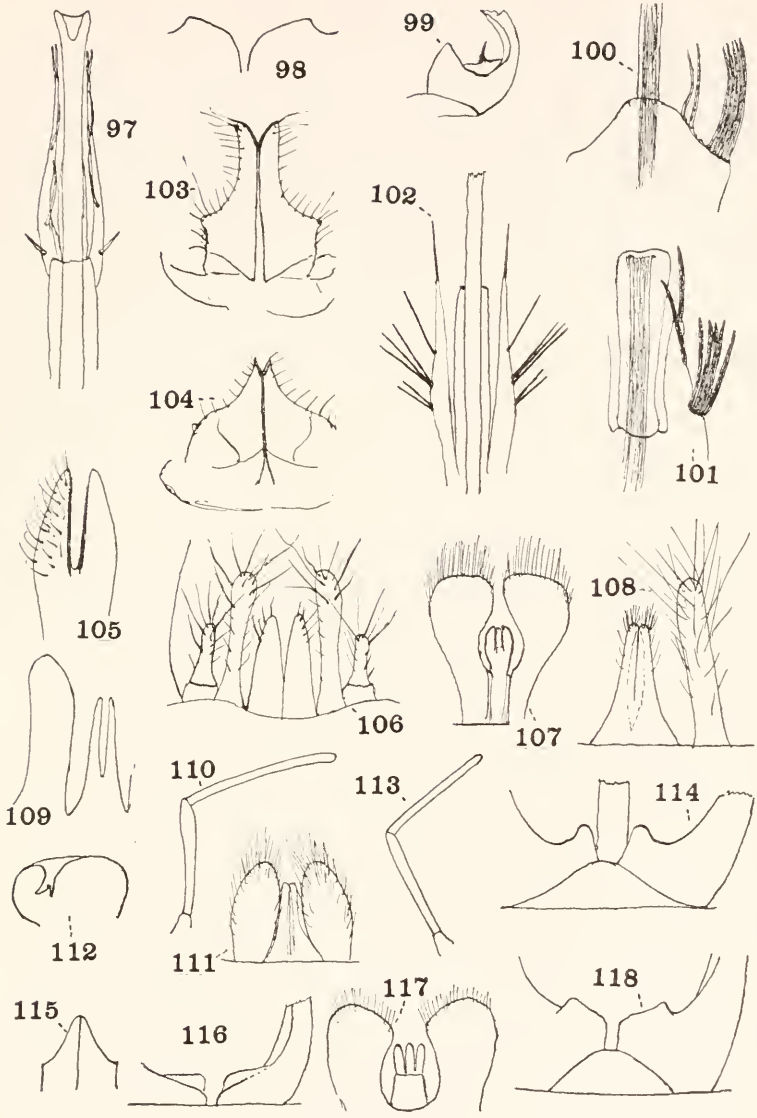
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PLATE 6

PLATE 6

Fig. 119. *Dicosmoecus tristis*, armature of sheath.
Fig. 120. *Dicosmoecus quadrinotatus*, armature of sheath.
Fig. 121. *Dicosmoecus quadrinotatus*, another specimen.
Fig. 122. *Dicosmoecus coloradensis*, armature of sheath.
Fig. 123. *Dicosmoecus alascensis*, armature of sheath.
Fig. 124. *Dicosmoecus occidentis*, armature of sheath.
Fig. 125. *Dicosmoecus occidentis*, another specimen.
Fig. 126. *Dicosmoecus unicolor* ?, from Banff.
Fig. 127. *Dicosmoecus unicolor* ?, from Alaska.
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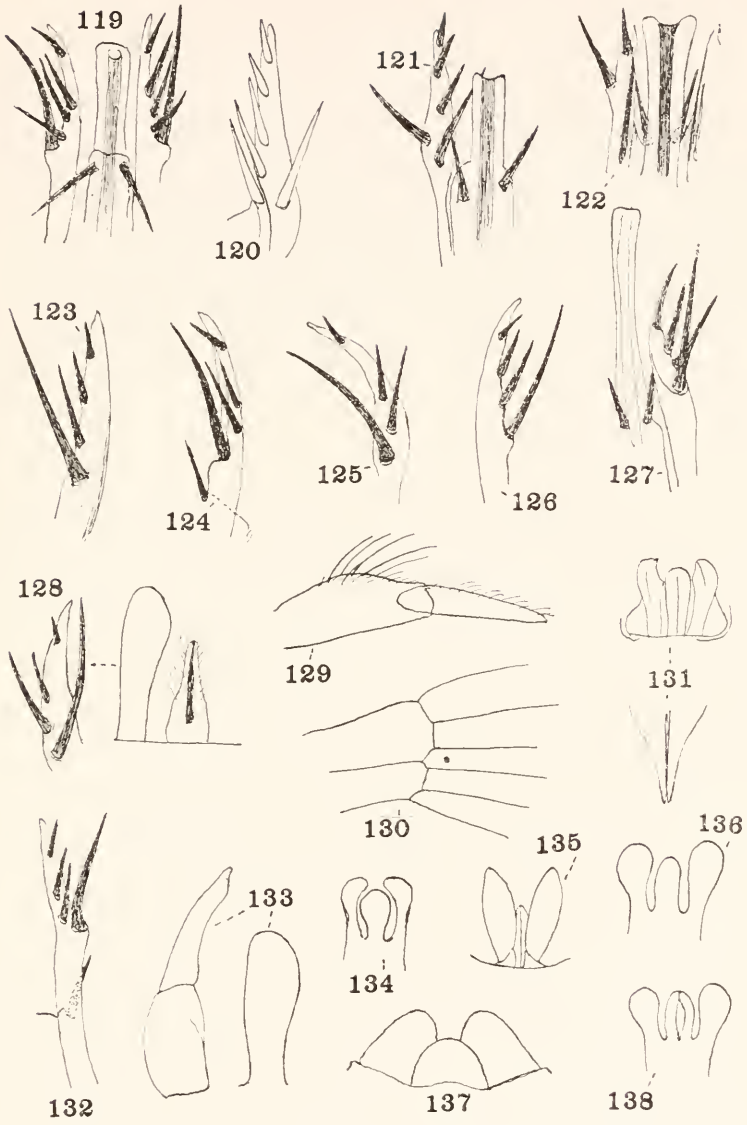
Fig. 129. *Dicosmoecus alascensis*, clasper from below.
Fig. 130. *Dicosmoecus coloradensis*, part of fore wing.
Fig. 131. *Dicosmoecus coloradensis*, female, pit on eighth ventral segment, and tip of abdomen from above.
Fig. 132. *Dicosmoecus occidentis*, armature of sheath, Ottawa specimen.
Fig. 133. *Dicosmoecus coloradensis*, clasper and cercus from above.
Fig. 134. *Dicosmoecus quadrinotatus*, pit on venter of female.
Fig. 135. *Dicosmoecus atripes*, female tip of abdomen from above.
Fig. 136. *Dicosmoecus occidentis*, female, pit on venter.
Fig. 137. *Notidobia arizonica*, tip of female, above.
Fig. 138. *Dicosmoecus tristis*, female, pit on venter.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Bulletin of the Museum of Comparative Zoölogy
AT HARVARD COLLEGE
VOL. XCII, No. 7

NEW CAVE AND EPIGEAN MILLIPEDS OF THE UNITED STATES, WITH NOTES ON SOME ESTABLISHED SPECIES

BY H. F. LOOMIS
Bureau of Plant Industry
U. S. Department of Agriculture

WITH ONE PLATE

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No. 7 — *New Cave and Epigean Millipeds of the United States, with Notes on Some Established Species*[1]

By H. F. Loomis

The present paper is based largely on collections of millipeds made by Mr. Leslie Hubricht, of the Missouri Botanic Garden, St. Louis, Missouri, and includes many surface species although his interest was centered on cave forms. His collections were begun in the summer of 1939 and extended into the spring of 1941 and included species from Alabama, Florida, Georgia, Illinois, Indiana, Kentucky, Missouri, North Carolina, Oklahoma, Pennsylvania, Tennessee, Virginia and West Virginia. The work was made possible by assistance from a research grant from the American Association for the Advancement of Science.

The Hubricht collection contained twenty-nine identifiable species of millipeds of which 19 previously have been described, thus leaving ten to be described. Of these latter species three have been made types of new genera; one the type of a new family; and the remaining six species have been placed in existing genera. In addition to the foregoing species, notes and descriptions of a few other species have been included where these have bearing on the paper or are needed in reference to synonymy.

Type specimens of the newly described forms are deposited in the Museum of Comparative Zoölogy, with paratype specimens deposited in the U. S. National Museum, except for one species, *Conotyla humerosa*, where deposit of type and paratype specimens has been reversed.

GLOMERIDAE

The three genera of this family now known from the United States are diagnosed in the following key.

Head not deeply and extensively depressed on either side for the accommodation of the antennae; vertex broadly convex; second segment without a deep groove proceeding upward from the lateral cleft . . . . . *Sonoromeris* Silvestri

Each side of head almost completely depressed, fully accommodating the antennae and restricting the vertex to a narrow ridge; second segment with a deep groove proceeding upward from the lateral cleft . . . . .

Body smooth and finely punctate; males with the seventeenth legs composed of only three rudimentary joints above the enlarged coxae; nineteenth legs with large finely corrugated processes on the posterior face of the last two joints . . . . . *Onomeris* Cook

[1] Published with the aid of a special gift from Mr. George R. Agassiz.

Body densely but minutely hispidulous, the setae rising from tiny punctures; males with the seventeenth legs somewhat reduced in size but composed of four normal joints above the enlarged coxae; nineteenth legs without corrugated processes on the posterior face of any of the joints ..... *Trichomeris* gen. nov.

TRICHOMERIS genus nov.

Body short and stout, only about twice as long as wide; very strongly convex; moderately pigmented; surface shining but densely and minutely hispid.

Head greatly depressed on each side for the reception of the antennae as in *Onomeris* and with the vertex similarly carinate, but in addition to the marginal row of ocelli found in that genus another ocellus is located behind the marginal series and is invisible from the front.

First and second segments much as in *Onomeris* although the latter has somewhat fewer striae above and in front of the deep groove proceeding from the posterio-lateral cleft.

Segments 2 to 11 inclusive with the posterior margin broadly and very shallowly emarginate on either side of the middle, causing the margin to appear to be caudally produced backward into an obtuse angle, this condition most plainly evident on the median segments.

Last segment as in *Onomeris*, evenly rounded behind in the female but abruptly emarginate at middle in the male.

Males with seventeenth legs somewhat reduced in size and with four joints, instead of three as in *Onomeris*, in addition to the enlarged coxae; eighteenth legs apparently much as in that genus but the nineteenth legs, although having several large lobes on the joints, lack "large finely corrugated processes from the posterior face of the last two joints" as mentioned in Cook's description of *Onomeris*.[1]

Type. *T. sinuata* spec. nov.

TRICHOMERIS SINUATA spec. nov.

Eleven specimens, A-5896, including the male type, collected "along pipeline trail below summit escarpment", Monte Sano State Park, 6 miles southeast of Huntsville, Madison Co., Alabama, April 12, 1941.

Description. Body short and stout, from 5 to 6 mm. long and from 3 to 3.2 mm. wide; surface of segments shining but strong magnification shows it to be densely beset with tiny short, erect bristles rising from minute punctations.

[1]Brandtia, pp. 43-45, 1896.

General color light brown; head with front colorless, elsewhere variably brown; basal joints of antennae colorless but thereafter gradually darkening to joint 7 which is colorless; first segment with a

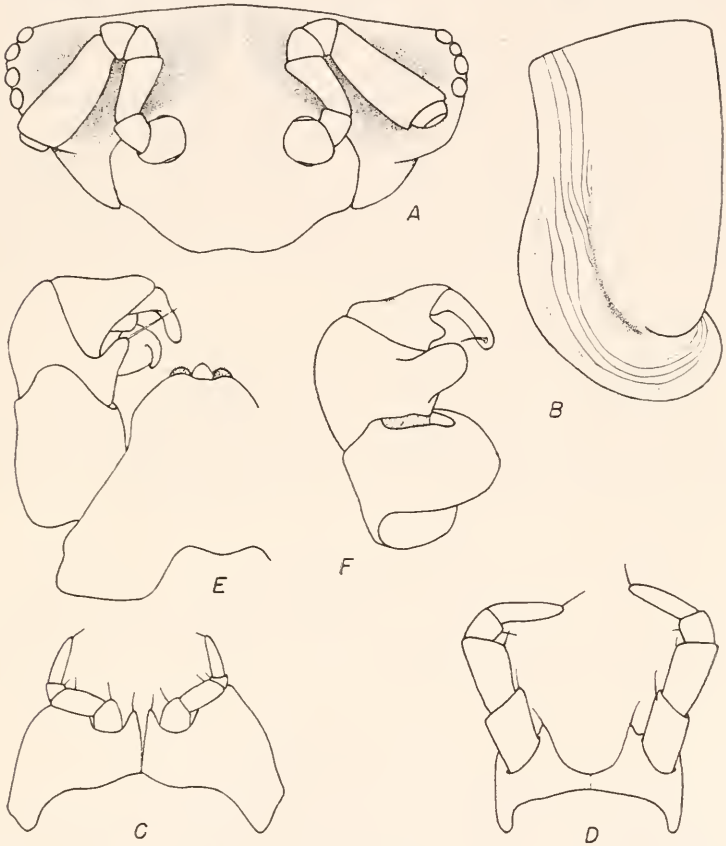

Fig. 1. *Trichomeris sinuata*. *a*, Head, anterior view; *b*, Segment 2, lateral view; *c*, Seventeenth legs of male, ventral view; *d*, Eighteenth legs of male, ventral view; *e*, Nineteenth leg of male, ventral view; *f*, Nineteenth leg of male, dorsal view.

large oval, transverse, light-maculate area occuping more than half the surface and crossed by two striae which are dark and in strong contrast; entire border of segment narrowly light colored; ensuing

segments to the solidly light brown last segment with a large oval, transverse light-maculate area on each side, the dorsum solidly brown; posterior margin of all segments light colored.

Head (Fig. 1 *a*) with vertex carinate, on each side of which the surface is deeply depressed to the series of 4 or 5 ocelli which are located on the lateral margin; behind this series, near its upper end, is another normal ocellus which is invisible from in front.

Segment 1 shaped as in *Onomeris* and also with similar twin striae.

Segment 2 much as in *Onomeris* but with fewer striae, usually only three crossing the dorsum as shown in figure 1 *b*. Segments 2 to 11 inclusive with the posterior border shallowly but broadly emarginate on either side of the middle, causing it to have the appearance of being produced backward into an obtuse angle more evident on the middle segments than on the subterminal ones.

Last segment large and hood-like as in *Onomeris*, that of the male being sharply emarginate at the middle of the posterior margin while in the female the margin is evenly continuous.

Males with seventeenth legs as shown in figure 1 *c*, having four joints above the enlarged coxae; eighteenth and nineteenth legs as shown in figure 1, *d*, *e* and *f*, the nineteenth legs without the corrugated processes on the posterior face of the two outer joints, as found in *Onomeris*.

POLYZONIIDAE

Polyzonium bivirgatum (Wood)

Eight specimens, A-5041, from "The Loop", 10 miles south of Gatlinburg, Sevier Co., Tenn., Aug. 10, 1939.

ANDROGNATHIDAE

Brachycybe petasata Loomis

Many specimens, A-5004, from under logs near Chimney's Camp, Great Smoky Mountains National Park, Sevier Co., Tenn., Aug. 10, 1939.

CLEIDOGONIDAE

Pseudotremia princeps Loomis

Many specimens, A-5011, from Luke's Cave, Teeterton, Pendleton Co., W. Va., Aug. 23, 1939.

Pseudotremia valga spec. nov.

A mature male (Type), six mature females and several young from King Solomon's Cave, Cumberland Gap, Tenn., July 26, 1924, G. P. Englehardt, collector.

Diagnosis. Located in the *P. princeps* series but with thicker, more prominent shoulders, particularly on the segments behind the anterior fourth of the body, than any of the other species; the bowed gonopods to which the specific name alludes, also are diagnostic.

Description. Male 22 mm. long, largest female 24 mm. long; body increasing in width to segments 6 and 7, thereafter narrowing very gradually until the last half dozen segments where it narrows more rapidly; dorsum much flatter than in *P. princeps;* color in alcohol ranging from brownish to bluish slate-gray.

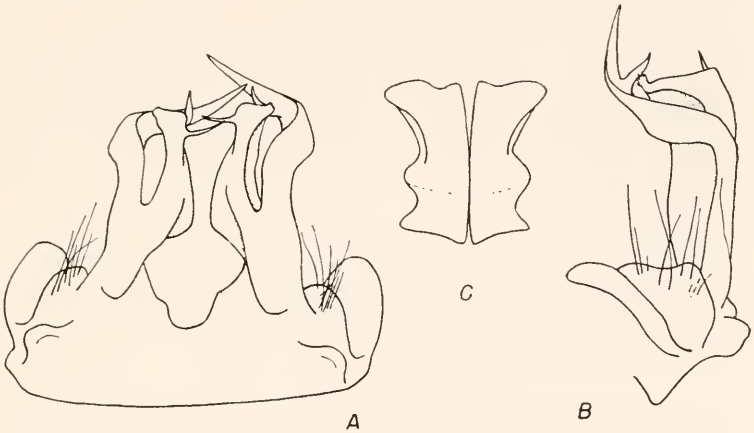

Fig. 2. *Pseudotremia valga. a*, Gonopods, anterior view; *b*, Gonopod, outer view from somewhat behind; *c*, Bifid laminae of gonopods, posterior view.

Ocelli dark brown or black, in a triangular group composed of 20 to 22 ocelli in six series paralleling the margin of the first segment, the distribution of ocelli approximately 6, 5, 4, 3, 2, 1, counting downward.

First segment with lateral angles scarcely projecting and not obviously thickened; second segment with moderately thick, slightly projecting, simple shoulders composed of a single ridge with a seta in front on the upper side, and another, the outer of the three dorsal setae, on the side of the body near the posterior end; succeeding seg-

ments with lateral shoulders prominent and compound, composed of a very thick elevated ridge or elongate swelling, sharply set off from the dorsal surface, with the second or middle seta at its upper anterior limit; on the outer side of this conspicuous swelling, and somewhat below its crest, is a very much smaller slender ridge which bears the outer seta at its posterior end; these compound shoulders are prominently projecting from segment 3 to about segment 22 or 23 and are faintly evident on two or three of the ensuing segments; lateral striations strongly evident on all but the last several segments; dorsum of the anterior segments smooth or at most with slight unevenness of surface; from the mid-body segments to segment 22 or 23 there are a few low, elongate swellings near the shoulders, and on the segments of the third quarter of the body several additional rounded, vesiculate swellings, which could almost be called tubercles, near the posterior margin.

Gonopods as shown in figure 2 *a*, and *b*, the apex of each bent backward between the ninth legs and covering the bifid laminae, the latter illustrated in figure 2 *c;* ninth legs 5-jointed, the four outer joints similar to those of *P. princeps* but the basal joint with a prominent lobe on the inner face; coxal prominences of the eleventh legs long and slender; legs 3 to 7 with a spongy pad beneath the last joint but none on the legs following the gonopods.

Pseudotremia cavernarum Cope

A mature female and two young ones, A-4848, from Wyandotte Cave, Crawford Co., Indiana, Sept. 1, 1939.

Pseudotremia nodosa Loomis

A half dozen broken specimens from English Cave, Powell River, Tenn., July 27, 1924, collected by G. P. Englehardt and received from the Museum of Comparative Zoölogy for identification.

Pseudotremia fulgida spec. nov.

Several males (one the type) and several females, A-4986, from Higginbotham Cave, 1.5 miles northwest of Frankford; and one female, A-5035, from Hayes Cave, .5 mile north of Lewisburg, Greenbrier Co., W. Va., Aug. 24, 1939.

Diagnosis. This species has an unusually slender body with no tubercles on the dorsum of any of the segments except several im-

mediately preceding the last segment; dorsal setae long and slender instead of short and clavate; no other species has eyes composed of so few ocelli.

Description. Largest specimen, a female, 20 mm. long; females subulate in outline, males quite fusiform, being distinctly widest at segments 6 and 7; body without pigmentation except for a small dilute brownish area at each eye, the colorless ocelli being set in this spot.

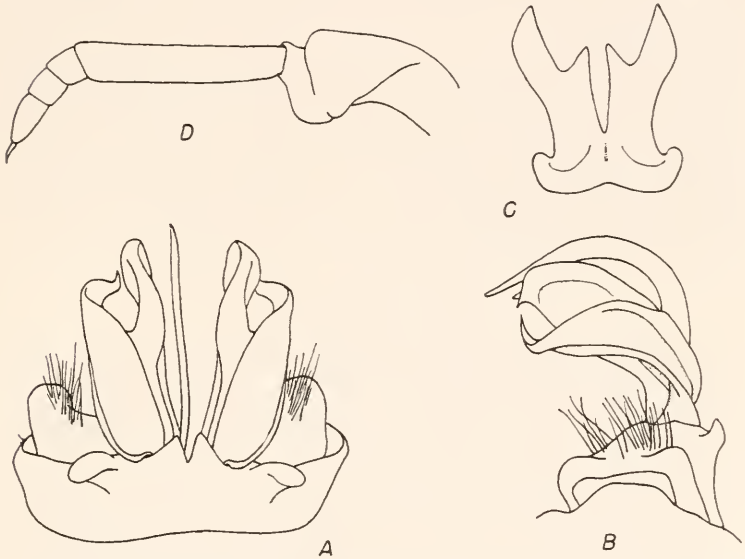

Fig. 3. *Pseudotremia fulgida. a*, Gonopods, anterior view; *b*, Gonopod, outer lateral view; *c*, Bifid laminae of gonopods, posterior view; *d*, Ninth leg of male.

Head with ocelli small and few in number, from 5 to 7 only, in a single series or with one or two ocelli above or below the single series; vertex smooth and shining with a few slender, erect setae; front smooth and shining above, becoming subrugose below, and with erect setae increasing in number below; clypeus distinctly rugose and densely setose; labrum smooth, shining, and deeply emarginate; antennae long and slender, the joints increasing in length in the following order—1, 7, 6, 2, 4, 5, 3.

Segments entirely smooth and shining above, the prozonites as well as the metazonites, the six dorsal setae of the latter long, slenderly acuminate and suberect; lateral shoulders of the male evident from the second to about the fourteenth segment but only to the eleventh segment in the female; males with the body broadening rapidly to segments 6 and 7 which are twice as wide as segment 2 and half again as wide as segment 14 and those that follow; females with anterior end of body increasing less in width to segments 6 and 7, behind which the body is parallel-sided to the caudal segments which narrow gradually; sides of segments with eight to ten striations which vanish on the posterior segments.

Male gonopods as shown in figure 3, *a* and *b*, with a simple falcate median structure analagous to that shown by Cook and Collins for *P. cavernarum* Cope[1]. The bifid laminae are shown in figure 3, *c;* ninth legs of male rather long, 5-jointed, as shown in figure 3, *d;* eleventh legs with a prominent, slightly curved, conic lobe projecting back from the posterior face of each coxa into a special recess in the anterior face of the coxa of the following leg.

Pseudotremia spp.

Mature females or immature specimens which could not be assigned to species with absolute certainty were collected in the following localities. Five immature specimens, A-5029, from Barker Cave, 6 miles north of Huntsville, Madison Co., Alabama, Aug. 5, 1939; many females and several immature specimens, A-5035, from Hayes Cave, one half mile north of Lewisburg, Greenbrier Co., W. Va., Aug. 24, 1939; one female, A-4986, from Higginbotham Cave, 1.5 miles northwest of Frankford, Greenbrier Co., W. Va., Aug. 24, 1939; two females and 5 immature specimens, A-5036, from Chimney Cave., 2.3 miles southwest of Pounding Mill, Tazewell Co., Va., Aug. 25, 1939; 1 immature specimen, A-4905, from Cudjo's Cave, near Cumberland Gap, Lee Co., Va., Aug. 28, 1939.

Dearolfia lusciosa Loomis

Many specimens, A-5013, from Seneca Caverns, near Riverton, Pendleton Co., W. Va., Aug. 22, 1939, Leslie Hubricht; about 8 specimens from Schoolhouse Cave, near Seneca, Pendleton Co., W. Va., July 4, 1940, Charles H. Daniels.

Cleidogona sp.

A very young specimen, A-5049, from Monte Sano State Park, east of Huntsville, Madison Co. Alabama (no date).

[1] Ann. N. Y. Acad. Sci., Vol. 9, Plate I, Fig. 2, 1895.

CONOTYLIDAE

Conotyla Cook & Collins

The genus *Conotyla* has doubled in size since its original treatment in 1895 by Cook & Collins without any attempt to bring the species into orderly arrangement. Examination of the literature usually shows few or no records of a given species after announcement of its discovery and in the original description or subsequent structural notes that have appeared there is no single character, not even exact measurements of length, that can be found common to all species. Another factor that makes comparison and identification of species difficult is that some of them were founded on female specimens, a practice to be condemned in the taxonomy of millipeds unless very outstanding differences of structure are exhibited. In the present genus the females of many species are without distinctive specific characters and it is only through association of collection with males that they may be safely identified. In spite of this unsatisfactory condition an attempt has been made to prepare a key from examination of specimens and existing descriptions that may aid recognition of the species.

Key to the species of Conotyla

Species of which males are known

Body without color; lateral carinae large and prominent; ocelli reduced in number, 7 to 10 in an oblong group ..... *humerosa* spec. nov.

Body with more or less color; lateral carinae small and not prominent; ocelli 15 or more in a triangular or quadrate group .....

Dorsum finely hispid ..... *bollmani* McNeill

Dorsum not hispid but reticulated, semi-rugose or smooth .....

Ocelli in more than 5 series, usually in 7 series .. *deseretae* Chamberlin

Ocelli in 5 series or fewer .....

Anterior gonopods consisting of broad, simple plates, rounded at tip, without prominent projections from the posterior side *montivaga* spec. nov.

Anterior gonopods more complicated, acute or various at tip or, if a broad plate, with one or more prominences on the posterior face, as in the next species .....

Males with joint 4 of the fourth legs not lobed, a lobe present on the fourth joint of the seventh legs ..... *vaga* Loomis

Males with a lobed fourth joint on the fourth legs but never on the seventh legs .....

Males with a lobe on the fourth joint of the fourth legs only.
atrolineata (Bollman)
Males with fourth joint lobed on more than one pair of legs.....
Males with a lobe on the fourth joint of legs 3, 4 and 5.
albertana Chamberlin
Males with a lobe on the fourth joint of only two pairs of legs.....
Males with a lobe on the fourth joint of legs 3 and 4.....*specus* Loomis
Males with a lobe on the fourth joint of legs 4 and 5.
fischeri Cook & Collins

Species of which only females are known

Eyes composed of 16 ocelli; posterior margin of segment 1 convex.
wyandotte (Bollman)
Ocelli more numerous; posterior margin of segment 1 straight or concave.....
Body only 10 mm. long; ocelli 19.....*glomerata* (Harger)
Body considerably longer; ocelli 22 to 24.....
Body 14 mm. long; gnathochilarium with a quadrangular mentum and a moderately large promentum.....*leibergi* Cook & Collins
Body over 20 mm. long; gnathochilarium with a semicircular mentum and a minute promentum.....*coloradensis* Chamberlin

Conotyla vaga Loomis

One mature male and several females and immature males, A-4894, "on boards at the landing", Alexander Caverns, near Naginey, Mifflin Co., Penna., Aug. 20, 1939; other young specimens, A-5019, apparently of this species from Arch Spring Cave, 7.5 miles southwest of Water Street, Blair Co., Penna., Aug. 21, 1939.

Conotyla specus Loomis

Many specimens, A-5399, from North Rankin Cave., 4 miles east of Eureka, St. Louis Co., Missouri, Feb. 11, 1940; two mature females and several young, A-5397, from South Rankin Cave, 4 miles east of Eureka, Missouri, Feb. 11, 1940; several males and females, A-5386, from Meramec Caverns, 2.5 miles southeast of Stanton, Franklin Co., Missouri, Dec. 16, 1939; a half dozen specimens, A-4634, from Morrison's Cave, 2 miles south of Burksville, Monroe Co., Illinois, Aug. 28, 1939; two young, A-4671, from Stemmler's Cave, 2 miles south of Bluffside, St. Clair Co., Illinois, Oct. 9, 1939.

Conotyla montivaga spec. nov.

Nearly a score of specimens, including the male type, from 7500 feet elevation, Santa Rita Mts., Arizona, Oct. 29, 1927; many specimens from Santa Catalina Mts., Arizona April 23, 1921; several specimens from Mescalero, New Mexico, May 8, 1931; all collections by H. F. Loomis.

Diagnosis. Closely related to *C. specus* but in lateral view the gonopods are seen to be materially different in the two species.

Description. Length 9 to 13 mm.; pigmentation weak, much as that in *C. specus.*

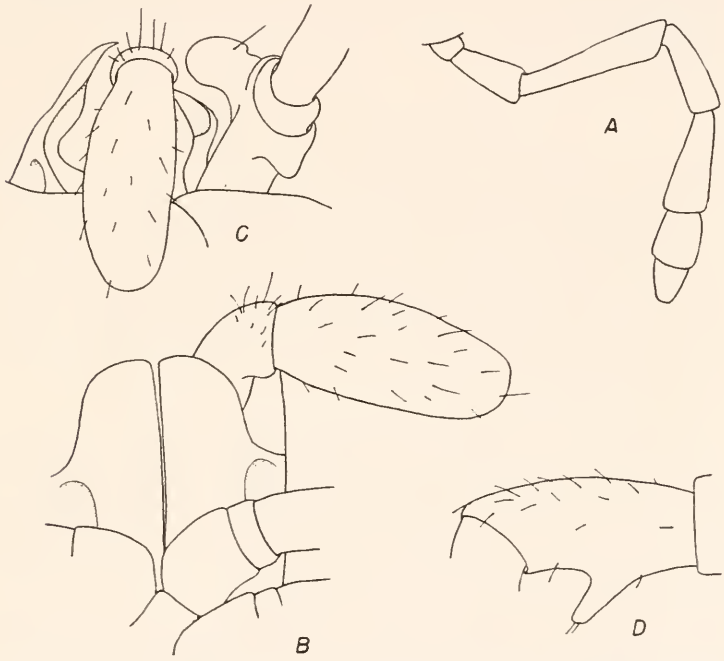

Fig. 4. *Conotyla montivaga. a*, Antenna; *b*, Gonopods and ninth leg of male, anterior view; *c*, Gonopod, ninth leg and basal joints of tenth leg, lateral view; *d*, Fourth joint of leg three of male.

Head with ocelli in four or five series in a subtriangular group, 3, 5, 6, 7 or 1, 3, 5, 6, 6; antennae rather short and stout as shown in figure 4, *a;* gnathochilarium with a small but definite triangular promentum which, however, is larger than that in *C. specus.*

Segments with lateral carinae not becoming apparent until on the fourth or fifth segment and completely lacking from the last half dozen segments; on the mid-body segments the carinae are represented by rounded shoulders very much less prominent than those of *C. humerosa.*

Gonopods as shown in figure 4, *b* and *c;* both anterior and posterior gonopods show the close relationship with *C. specus* although they exhibit obvious differences.

Males with a long slender lobe on the under side of the fourth joint of legs 3 and 4 as shown in figure 4, *d*; last joint of legs 3 to 7 granular-tuberculate beneath; tenth legs with a very large knob-like lobe on the front face of each coxa projecting under the gonopods when the legs are in normal position.

Conotyla humerosa spec. nov.

About a dozen specimens, including the male type, collected "on mine props throughout Sunnyside Mine, 100 to 900 feet from entrance of mine, Jan. 22, 1923, 3 miles southwest of Seneca, Plumas Co., Calif." by H. S. Barber.

Diagnosis. Differing from other members of the genus in the much larger lateral carinae of the segments; the reduced number of ocelli; the very long and slender antennae; and the complete lack of color, the latter three characters being taken as indications that the species is a true cave form.

Description. Body without color; length from 17 to 21 mm.

Head with 7 to 10 ocelli in an elongate group on each side, mostly in two horizontal series as 4–3, 4–4, or with one or two ocelli opposite the posterior end of the interval between the two series of ocelli; antennae very long, capable of reaching nearly to the posterior margin of segment 5, and very slender as shown in figure 5, *a*; gnathochilarium with a small but definite triangular promentum.

First segment with front margin very strongly rounded, posterior margin transverse; segment longer than a semi-circle, the proportion of width to length being 8 to 5.

Beginning with the second segment the lateral carinae increase in size to about segment 6, from which to about segment 20 they are especially prominent and are definitely elevated to the level of the dorsum and, when viewed from above, cause the segments to bear considerable resemblance to those of *Polydesmus;* behind segment 20 the carinae decrease in size to about segment 25 or 26 after which they no longer are apparent; surface of segments shining; dorsal setae in

usual places, one at each corner of the lateral carina and one, borne on a small tubercle, at the anterior end of the depression formed between the lateral carina and the dorsum.

Male gonopods with the principal joint ending in a sharply decurved hook, preceded at base by a shorter, stouter, conic lobe; mesial edge of this joint laciniate, with 4 or 5 long and slender, ensiform processes directed forward as shown in figure 5, *b* and c.

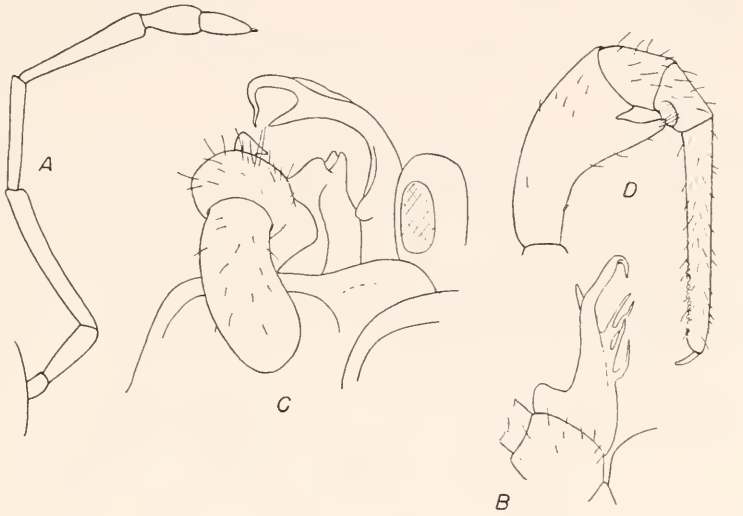

Fig. 5. *Conotyla humerosa*. *a*, Antenna; *b*, Gonopod, anterior view; *c*, Gonopod and ninth leg of male, lateral view; *d*, Four distal joints of leg 6 of male, posterior view.

First and second legs of male with a comb of fine hairs beneath the outer joint; coxae of second legs with a prominent, sub-conic inner corner; other joints of these legs unmodified; legs 3 to 7 with the last joint gradually tuberculate on the under side of the outer half, the coxae of these legs normal; legs 5 to 7 with the fourth joint bearing a conic lobe on the inner apical fourth; on leg 6 the apex of this lobe is received in a cavity in the inner face of joint 6 as shown in figure 5, *d*; the two-jointed ninth legs have the outer joint of the usual shape but smaller than usual for the genus; tenth legs with the lobe at the base of the third joint on the posterior side short, conic, smaller than the lobe in *C. fischeri*, and directed meso-caudad.

Scoterpes copei (Packard)

One female, A-4971, Ruby Falls Cave, near Chattanooga, Hamilton Co., Tenn., Aug. 7, 1939; 3 specimens, A-5027, Gregory's Cave, Cades Cove, Great Smokey Mts. National Park, Sevier Co., Tenn., Aug. 9, 1939; 4 specimens, A-4912, White's Cave, near Mammoth Cave postoffice, Edmonson Co., Ky., Aug. 30, 1939; 1 specimen, A-4917, near Richardson's Spring, Mammoth Cave, Edmonson Co., Ky., Aug. 30, 1939.

Scoterpes austrinus spec. nov.

Plate 1, figures 1 and 2

Three males, one the type, and four females, A-5003, from Manitou Cave, 1 mile south of Ft. Payne, DeKalb Co., Alabama, Aug. 4, 1939; 12 specimens, A-5001, from Saltpeter Cave, four miles south of Kingston, Bartow Co., Ga., Aug. 4, 1939.

Diagnosis. Although closely related to *S. copei* (Packard) the size is larger and the gonopods are materially different.

Description. Length 9 to 10.5 mm., a young distended male 12 mm. long; body without pigmentation.

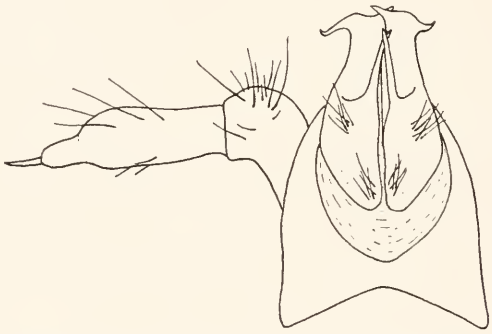

Fig. 6. *Scoterpes austrinus.* Gonopods and ninth leg of male, anterior view.

Segments with dorsal rows of setae closer together than in *S. copei*, the two rows of the first segment separated by a distance not greater than two-thirds the length of one row; on ensuing segments the intervals correspondingly narrower than in *S. copei;* the ridges bearing the setae are slightly higher and the outer shoulder more prominent than in that species.

Preanal scale semi-circular, the posterior margin evenly rounded.

Gonopods and ninth legs of male as shown in figure 6. In the males from Saltpeter Cave in Georgia the ninth legs are shaped the same as in specimens from Alabama but lack the terminal claw.

Third and fourth male legs slightly more crassate than adjoining legs; none of the legs in front of the gonopods have special swellings or tubercules on the ventral face of the joints but on legs 3, 4 and 5 the last joint is conspicuously more setose beneath than on the two pairs of legs on either side, with a somewhat more dense, almost brush-like, group of hairs at the tip beneath the claw.

Scoterpes dendropus Loomis

A female, A-5165, collected in Old Spanish Cave, 8 miles east of Galina, Stone Co., Mo., Oct. 21, 1939.

Zygonopus whitei Ryder

A score of specimens, A-5026, from Shenandoah Caverns, 4.5 miles south of Mt. Jackson, Shenandoah Co., Va., Aug. 13, 1939; 6 specimens, A-5000, from Luray Caverns, Luray, Page Co., Va., Aug. 14, 1939.

RHISCOSOMIDIDAE

Tingupa pallida Loomis

A score of specimens, A-5655, from type locality, River Cave, Hahatunka, Camden Co., Mo., Aug. 4, 1940; other specimens are from the following Missouri localities—A-5070, Missouri Caverns, 5 miles southeast of Leasburg, Crawford Co., Oct. 8, 1939; A-5381, Indian Ford Cave, 2 miles east of Vienna, Maries Co., Dec. 15, 1939; A-5548, Holmes Cave, 4.5 miles east of Patterson, Wayne Co., June 9, 1940; A-5589, Bat Cave, 7 miles northeast of Success, Texas Co., July 5, 1940; A-5628, Onyx Cave, on bluff above Brazil Creek, 3 miles north of Campbel Bridge, 8 miles southeast of Bourbon, Crawford Co., July 28, 1940; A-5663, Flanders Cave, 2.5 miles south of Aurora Springs, Miller Co., Aug. 4, 1940; A-5675, Bat Cave, 5 miles south of Crocker, Pulaski Co., Aug. 17, 1940.

One of the posterior gonopods is shown in oblique lateral view in figure 7. The complete gonopods were shown in anterior view in Bull.

Fig. 7. *Tingupa pallida*. Posterior gonopod, anterior view.

Mus. Comp. Zoöl., Vol. 86, No. 4, p. 186, Fig. 12 b, 1939, but in that figure only the tips of the posterior gonopods are visible.

LYSIOPETALIDAE

Spirostrephon magnum spec. nov.

The mature male type, two other mature males, a female and several young A-5054, collected in Monte Sano State Park, east of Huntsville, Madison Co., Alabama, July 22, 1939.

Diagnosis. Exceeding in size of body and number of primary crests on the posterior segments the other species of the genus. The gonopods also are definitely different.

Description. Body from 40 to 50 mm. long and to 3.5 mm. broad, the males conspicuously broader and flatter than the rather small female which, however, appears to be fully mature; number of segments 57 to 59; color rather dark brown, a lighter median stripe extending the length of the body.

Head definitely granular in front below the level of the antennae which have joint 3 slightly longer than joint 2, an unusual condition in this family; ocelli black, in a triangular patch, numbering 43 to 52.

First segment with only 18 conspicuous crests on the posterior half.

On ensuing segments the primary and secondary crests are approximate in size, the total number of crests inconstant through reduc-

tion of the normal number of additions thereto, which make it impossible to determine with exactness the point of transition from the anterior segment crests to the full complement of the mid-body region, although this transition appears to take place at about segment 12 as with two of the other species in which the transition has been noted. Differing from other members of the genus and even of the family in the increase over the normal number of crests of the primary and secondary crests on the posterior segments where both classes of crests are readily distinguished, especially since only the primary crests

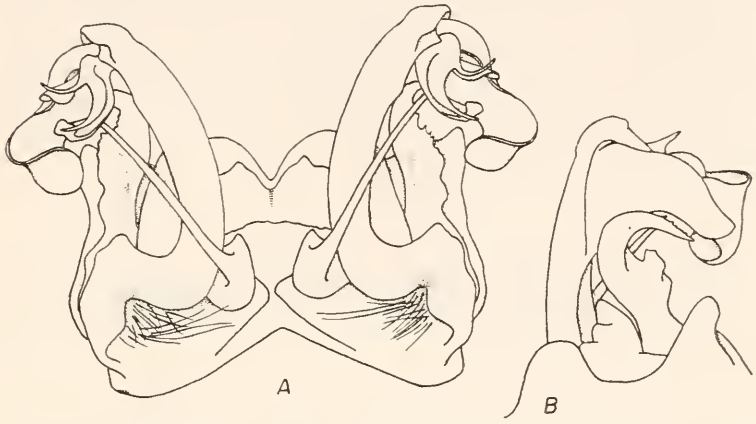

Fig. 8. *Spirostrephon magnum*. *a*, Gonopods, anterior view; *b*, Gonopod, outer lateral view.

have a posterior seta; on from 8 to 12 segments preceding the anal segment there are consistently four primary and five secondary crests between the median line and the poriferous keel on either side of the body whereas the customary number for other species is three primary and four secondary crests although increased numbers may at times be found which are not constant for the species; all dorsal crests are slender, moderately elevated with apex smooth and shining, the lower sides and intervals between the crests finely granular; pore area occupying the anterior half of the keels at the front of the body but becoming more extensive farther back, eventually occupying the entire outer margin; below the poriferous keels are two high crests, much more prominent than the dorsal primary crests, and these are to be seen in dorsal view, each terminating in a sharp, slightly produced,

upturned angle; much lower crests are present ventrad of these two high crests.

Male gonopods as shown in figure 8, *a* and *b*, having the subapical structure on each side with four branches; laterad of the main armature a prominent, stout, uncate process is elevated beneath the principal curved, spatulate arm.

Females with a comb of fine setae beneath the outer joint of the first three pairs of legs.

Males with first and second legs little more than half as large as the third legs, each with a comb of setae beneath the outer joint; a spongy pad present on the disto-ventral half of the outer joint of legs 3 and 4, similar pads, decreasing in size, are present on the ensuing nine or ten pairs of legs; coxae and ventral face of the third and fourth joints of the legs from the fourth pair to near the posterior end of the body finely velutinous except that on the fourth joint this condition does not extend beyond the legs at the middle of the body.

Spirostrephon sp.

A young specimen, A-4933, from Sneed's Spring Cave, Sharp's Cove, 8 miles northeast of Marysville, Madison Co., Alabama, July 23, 1939.

CAMBALIDAE

Cambala cristula Loomis

Many specimens, A-5033, from Kymulga Cave, 7 miles northeast of Childersburg, Talladaga Co., Alabama, July 18, 1939; many specimens, A-5008, from Florida Caverns, north of Marianna, Jackson Co., Florida, July 29, 1939.

One male in the Florida collection has a very unusual abnormality, never before observed, in that following the sixth segment there are two legless segments, each with a typical aperture for the gonopods and each containing what appears to be a complete and normal set of gonopods.

Cambala minor (Bollman)

Nearly a dozen specimens, A-5368, from Cellar Cave, Zell, Genevieve Co., Missouri, Dec. 9, 1939; many specimens, A-5411, from cave on bluff one half mile north of Fults, Munroe Co., Illinois, Mar. 31, 1940.

Choctella cumminsi Chamberlin

Psyche, **25**, 2, p. 25, 1918.

Examination of a paratype male in the Museum of Comparative Zoölogy resulted in several interesting discoveries. The stipes of the gnathochilarium, which is shown in figure 9, *a*, each have, on the anterior third, an oblique rectangular elevated area with a large perforation distally, the remaining surface coarsely roughened as if densely punctate, the rest of the stipe and other parts of the gnathochilarium

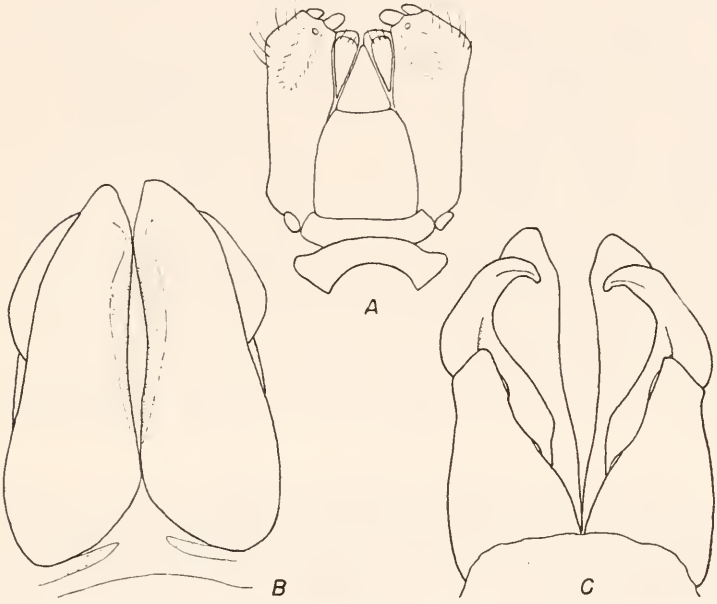

Fig. 9. *Choctella cumminsi*. *a*, Gnathochilarium; *b*, Gonopods, anterior view; *c*, Gonopods, posterior view.

smooth and shining. The pores are as described on all but the caudal segments where the pore is in line with the sulcus or even behind it, with the sulcus interrupted opposite the pore. An important generic character previously unmentioned is the complete absence of a preanal scale. Gonopods as shown in figure 9, *b* and *c*. Seventh segment of the male deeply and widely excised from in front ventrally, the median ventral suture behind it widely open with the slender portion of the segment on either side ending in a rather large globular, semi-membranous body.

CAMBALOPSIDAE

Titsona sima Chamberlin

Ann. Ent. Soc. Amer., **5**, 2, p. 160, 1912.

In the collection of the Museum of Comparative Zoölogy are a score of specimens from Yolo County, California, collected Feb. 28, 1914 by L. Childs and identified as this species by R. V. Chamberlin. The largest specimen is a male with 52 segments. The gnathochilarium has an undivided mentum, as shown in figure 10, *a*, quite contrary to

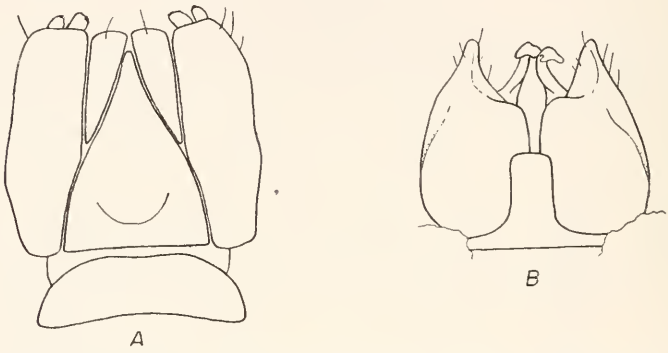

Fig. 10. *Titsona sima*. *a*, Gnathochilarium; *b*, Anterior conopods, anterior view.

the statement in the original description. Thus, although the type specimen has not been seen, on Chamberlin's identification of the Yolo specimens it seems that the genus must be removed from the Cambalidae and relocated in the Cambalopsidae in close association with *Endere*.

As stated in the specific description, the gonopods are much reduced in size. They are rather poorly chitinized and of the form shown in figure 10, *b*. In other particulars the Yolo specimens agree with the original description.

PARAIULIDAE

Paraiulus sp.

One female, A-4674, from Stemmler's Cave, 2 miles south of Bluffside, St. Clair Co., Illinois, Oct. 9, 1938.

A new family of the order ZYGOCHETA

If one were to use Attems' interpretation of the family Blaniulidae, as presented in Kukenthal's "Handbuch der Zoologie" Vol. 4, pp. 182–5, 1926, it would be found that the genus hereafter described under the name *Zosteractis* should be included there. However, outstanding characters of this genus would exclude it from any of the three established subfamilies, the Blaniulinae, Paraiulinae or Uroblaniulinae, as the two pairs of gonopods differ in size, the anterior ones being long and slender, in remarkable contrast to the short and thick posterior ones. In Attems' subfamilies the gonopods are similar in size, both pairs being either long and slender or short and thick. Adherence to his classification system would require that *Zosteractis* be made the type of a fourth subfamily but not everyone will accept his proposal that such structurally diverse groups as the iulids, paraiulids, spirobolids, spirostreptids and cambalids be associated in a single order. Instead it is thought more reasonable to use a somewhat older classification which recognizes the diversities of these groups by placing them in three orders, the Zygocheta, Anocheta and Diplocheta. Under this seemingly more natural arrangement the genus *Zosteractis* is proposed as the type of a new family of the Zygocheta, ranking with the Iulidae, Paraiulidae, Blaniulidae, etc., with relationship closest to the last named family.

ZOSTERACTIIDAE fam. nov.

Body slender, submoniliform, the segments constricted in front of the middle, the posterior portion noticeably convex; each segment from the first to the last inclusive with a series of erect setae along the posterior margin.

Head eyeless; with two setae on the vertex; antennae rather stout; mandibulary combs four.

Segments with pores well behind the transverse constriction.

Legs slender, not projecting beyond sides of body; claw long and attenuated; first two pairs of legs with sterna free, sterna of all other legs coalesced.

Anterior gonopods long and slender, projecting far outside of the body; the posterior pair short and thick, contained within the body; flagella apparently present but either reduced in size or broken.

First pair of male legs five-jointed but greatly reduced in size, the outer joints modified.

Zosteractis gen. nov.

Body long and slender, with a high but indeterminate number of segments; all the apparently mature specimens have three legless segments at the posterior end of the body, possibly a degenerate condition induced by cave life; pigmentation dilute.

Head hemispherical, eyeless; vertex smooth, without a median furrow but with two widely separated setae; clypeal setae 4; labral setae 16; antennae rather short and stout; females with mandibulary stipes subtriangular, those of the males larger, subquadrangular, having a lower anterior corner produced forward into an angularly rounded lobe.

Segments from the first to the last inclusive with a series of from 10 to 24 long erect setae along the posterior margin, the number of setae increasing from front to back of body, the series beginning considerably below the pores on the leg-bearing segments but almost completely encircling the legless ones preceding the anal segment; segments with a strong but broad and indefinite constriction in front of the middle; the surface of the prozonite reticulated; surface of the metazonite smooth, shining and noticeably convex, a few sublateral striations present; pores small, beginning on segment 6.

Last segment slightly surpassing the anal valves, the apex broadly rounded; dorsum with three transverse rows of erect setae.

Anal valves evenly inflated, meeting at a reentrant angle; two long setae on each valve near the opening; preanal scale elliptical, with two long setae near the posterior margin.

Legs rather small and weak, not extending beyond the sides of the body; claws very slender and long, equalling the last joint in length.

Gonopods greatly differing in size; the anterior ones long, slender and projecting far outside the body; the posterior ones short, stout and almost completely hidden within the body.

Males with the first pair of legs much reduced in size, with a coxal joint and four outer joints, the penultimate of which is greatly modified; second legs of normal size and shape.

Females with first two pairs of legs slightly more crassate than the ensuing legs.

Type. *Z. interminata* spec. nov.

Zosteractis interminata spec. nov.

Three males, one the type, and three females, A-6394, Jan. 25, 1942 and one female and the anterior end of a male, A-5398, Feb. 11, 1940, from South Rankin Cave, 4 miles east of Eureka, St. Louis Co., Missouri; one female, A-5369, from Cellar Cave, Zell, Ste. Genevieve Co., Missouri, Dec. 9, 1939.

Length 15 to 23 mm., width 0.5 to 0.7 mm. Number of segments variable, the three males with 64, 67 and 81 segments, the four females with 57, 58, 64 and 65 segments; all specimens with the last three segments legless; another female with 52 segments has four legless caudal segments. Living color apparently quite dilute as in specimens received only 5 days after collection the anterior end of the body was light pink, changing to uniform light transparent brown at the middle of the body and behind; repugnatorial glands showing as dark areas through the body wall; specimens preserved a year had lost any color that had been present.

Head reticulated behind the two widely separated setae on the vertex, the entire surface in front of them smooth and shining; antennae rather short and stout as shown in figure 11, *a;* joints 3 and 6 subequal in length and longer than subequal joints 2, 4 and 5; joint 5 thickest; eyes absent; gnathochilarium as shown in figure 11, *b.*

First segment about as long as the next two segments together; front margin broadly rounded at middle, slightly emarginate on each side behind the mandibulary stipe; lateral angle quite acute, the posterior margin proceeding straight upward from it; a series of 10 to 12 erect setae just in front of the posterior margin; surface in each lateral angle with two or three short striae beginning at the emargination.

Ensuing segments with the erect setae along the posterior margin longer on the first and last few segments than on the intervening ones where there are about 16 setae on each segment but on the legless antepenultimate and the penultimate segments there are about 24 setae almost encircling the segments; pores small, surface below them with 5 to 8 lateral striae more prominent on the anterior segments.

Last segment with the dorsum about twice as long as the two foregoing segments together; erect setae longer than elsewhere on body, in three transverse series, 10 setae in the anterior row, 6 in the middle row and 12 in the posterior marginal series.

A leg from the middle of the body, with the typical long and slender claw, is shown in figure 11, *c.*

Gonopods with the anterior pair projecting far outside the body, as shown in figure 11, *d,* extending backward along the ventral surface

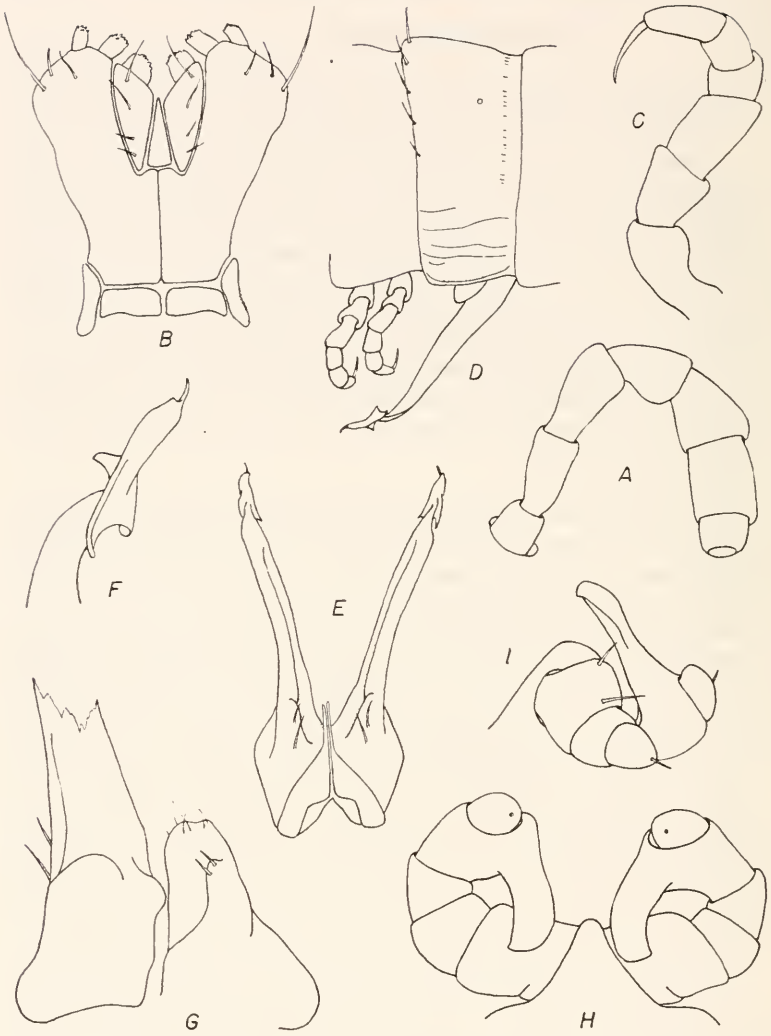

Fig. 11. *Zosteractis interminata*. *a*, Antenna; *b*, Gnathochilarium; *c*, Leg from middle of body; *d*, Segments 6, 7 and 8 in lateral view showing the protruding anterior gonopods and the two pairs of legs of segment 8; *e*, Gonopods, anterior view; *f*, Tip of anterior gonopod; *g*, Posterior gonopod and base of anterior gonopod, lateral view; *h*, First legs of male, anterior view; *i*, First leg of male, oblique lateral view.

with the tips reaching to the coxae of the fourth pair of normal legs behind them; other views of these gonopods are shown in figure 11, *e* and *f;* posterior gonopods short and stout, as shown in figure 11, *g*, and concealed within the body when the anterior pair are in normal position.

First pair of male legs greatly reduced in size and modified as shown in figure 11, *h* and *i*.

First and second pairs of female legs noticeably stouter than ensuing legs.

NEMASOMIDAE

Nemasoma sayanum Bollman

Bull. U. S. Nat. Mus., No. 6, p. 145, 1893.
Julus punctatus Say. Jour. Acad. Nat. Sci. Phila., **2**, 102, 1821.
Julus stigmatosus Brandt. Recueil, p. 88, 1841.

A male and two females, A-5043, all lacking one or two moults of maturity, collected on "The Loop," 10 miles south of Gatlinburg, Sevier Co., Tenn., Aug. 10, 1939.

SPIROBOLIDAE

Arctobolus marginatus (Say)

Although this is one of the most widely recorded North American millipeds its range has not been fully and accurately determined on the

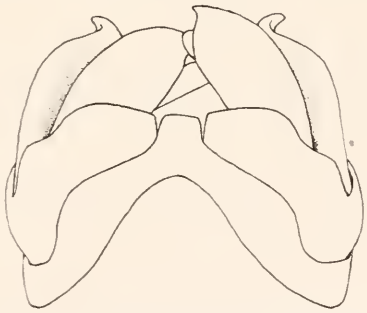

Fig. 12. *Arctobolus marginatus.* Gonopods, anterior view.

basis of recent knowledge of the species. It is probable that some of the southern records of this species actually refer to *A. dolleyi,* a species hereafter described.

For purposes of comparison with that and other species the gonopods of a specimen of *A. marginatus* from Maryland are shown in anterior view in figure 12.

Arctobolus spinigerus (Wood)

Spirobolus spinigerus Wood. Proc. Phila. Acad. Nat. Sci., p. 15, 1864.
Spirobolus paludis Chamberlin. Ann. Ent. Soc. Amer., **11**, 374, 1918.

Specimens of this species from Key West, Florida to as far north as South Carolina have been examined. It is one of the few species commonly found in the vicinity of Miami, Florida, where it frequently may be seen crawling across the country roads at almost any time of the year. Examination of the gonopods and other structural features of the type of *S. paludis*, in the Museum of Comparative Zoölogy, leaves no doubt that it is a synonym of *A. spinigerus*.

Arctobolus dolleyi spec. nov.

This species is named for Mr. John S. Dolley who sent me specimens from the following Mississippi localities in 1937; 22 specimens, including the male type, Feemster's Lake area near Tupelo, Lee Co., May 10; 10 specimens, 3 miles north of Tupelo, May 5; 21 specimens, 3½ miles northeast of Shannon, in Town Creek bottom, Lee Co., (no date); 2 specimens, 3 miles southeast of Vernon, Pontotoc Co., March 31; 3 specimens, 9 miles southeast of Pontotoc, Pontotoc Co., April 26; 1 specimen, Jack Fontaine farm, 2 miles south of Pontotoc, May 26. Leslie Hubricht collected 3 males, A-5057, in Monte Sano State Park, east of Huntsville, Madison Co., Alabama, July 22, 1939.

Diagnosis. This is a larger species than *A. marginatus*, the pores are further removed from the transverse sulcus and there are differences shown by the gonopods and coxal lobes of the pregenital legs.

Description. Size from 80 to 120 mm. long and from 7.5 to 10 mm. in diameter; number of segments 51 to 61.

In life the surface of the body is dully shining, the posterior portion of each segment more shining than the anterior portion; head with clypeal region light brown, gradually darkening to almost black on the vertex; first segment surrounded by a dark red band, widest in front and narrowest at the lateral angles, the median area almost black; segments black in front of the transverse constriction, nearly dark brick red behind it; last segment red at apex only; anal valves with margins

red; antennae and outer joints of the legs purplish pink, the basal joints of the legs yellowish.

Head with median furrow of vertex short but deep, that of the frontal area longer and deeper, the two widely separated; clypeus usually with 5 fovea on each side but sometimes with only 4; ocelli at times in 5 series but usually in 6 series, the total number of ocelli from 36 to 44; antennae with joint 2 considerably longer than any other joint.

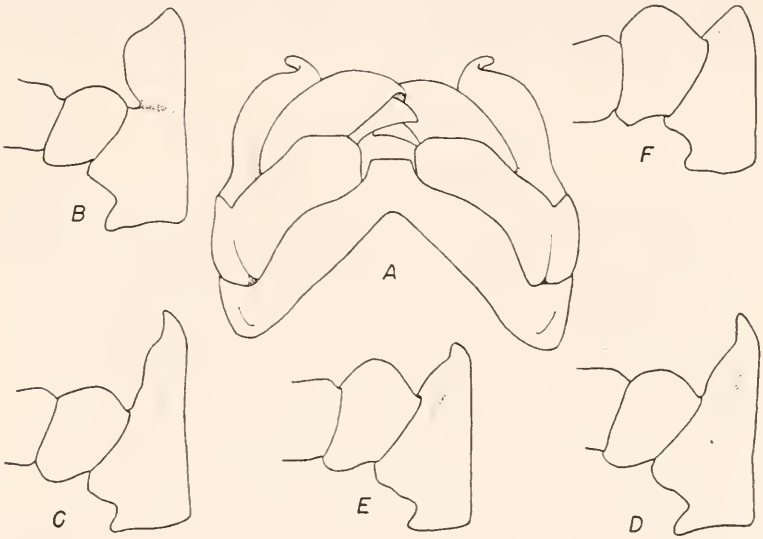

Fig. 13. *Arctobolus dolleyi*. *a*, Gonopods, anterior view; *b*, *c*, *d*, *e*, and *f*, Basal joints of male legs 3, 4, 5, 6 and 7 respectively.

First segment with the anterior margin on each side usually shallowly emarginate just back of the antennae.

On ensuing segments the suture between mid- and hind-belts is impressed throughout its length from the feet across the dorsum; mid-belt flat or even slightly concave, densely and coarsely punctured; hind-belt slightly convex with smaller but almost as numerous punctures as on the mid-belt; pores well in front of the suture which bends forward behind the pore, at times only just touching the smooth area surrounding the pore.

Last segment very finely punctured except at apex where the punc-

tures are coarser but not as coarse as on segments farther forward. Anal valves minutely punctured on the sides with a few coarse punctures near the thickened margins which, however, are almost free of them and are strongly shining.

Gonopods as shown in figure 13, *a*. Males with coxal lobes of third legs swollen, shaped as shown in figure 13, *b;* coxal lobes of next three pairs of legs thinner, shaped as shown in figure 13, *c*, *d* and *e*, with tip of each usually strongly chitinized; coxal lobes of seventh legs thicker, the tips seldom specially chitinized, shape as shown in figure 13, *f;* third joint of legs 6 and 7 greatly compressed from front to back, the posterior face deeply concave.

DESMONIDAE

Desmoniella gen. nov.

Diagnosis. Distinguished by having only 19 segments and with their surface entirely smooth although minutely hispid; body without pigmentation; second segment with lateral carinae much more produced than in *Desmonus*, extending downward as far as does the large third segment and much surpassing the first segment; pits of the anterior basal margin of the lateral carinae found only on segments 4 to 10 inclusive, instead of extending much farther back as in *Desmonus*.

Description. Body of the proportions of *Desmonus* although the size smaller and the body composed of only 19 segments; surface of segments lacking irregularities but sparsely and very minutely hispid and with segments 1 and 2 with several additional long setae.

Second segment with lateral carinae much more produced than in *Desmonus*, greatly surpassing the lower limits of the first segment and reaching as low as does the third segment.

Third segment largest of all but relatively smaller than that in *Desmonus*, the lower limits of the carinae subtruncate rather than progressing in a curve to the acute posterior corner as in that genus.

Segment 4 not appreciably larger or otherwise different from immediately ensuing segments; the peculiar pits, characteristic of this family and located on the front of the segments at the base of the carinae, begin on segment 4 and are continuous only to segment 10 beyond which they are absent.

Last segment large and hoodlike and of the same shape as in *Desmonus*.

Gonopods showing obvious relationship to *Desmonus*.

Type. *D. curta* spec. nov.

Desmoniella curta spec. nov.

Plate 1, figure 3

About ten specimens, A-5489, including the male type, from Arbuckle Mts., 2.3 miles south of Fittstown, Pontotoc Co., Oklahoma, May 22, 1940.

Maximum length from 5.5 to 6 mm.; body without color; surface shining but magnification shows a very few minute setae apparently restricted to the posterior portion of the segments; segments 1 and 2

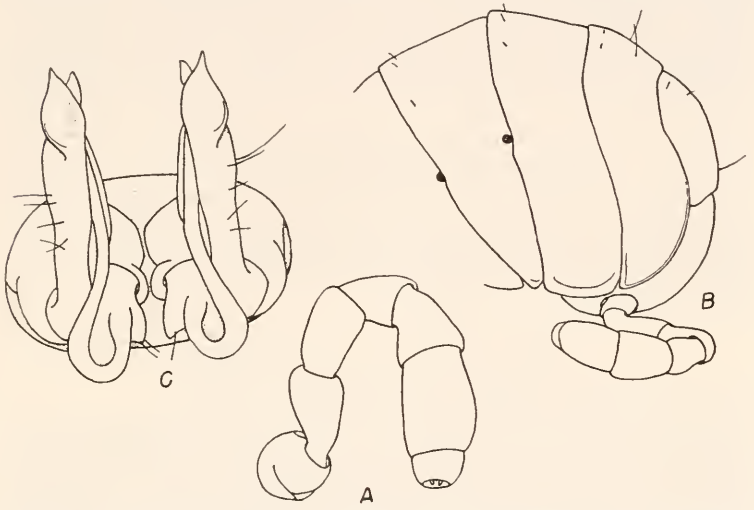

Fig. 14. *Desmoniella curta*. *a*, Antenna; *b*, Head and first four segments, lateral view; *c*, Gonopods, anterior view.

have several long setae in addition to the very minute ones; antennae and anterior end of the body as shown in figure 14, *a* and *b*.

Gonopods as shown in figure 14, *c*.

Other characters of possibly only specific importance are given in the generic description.

XYSTODESMIDAE

Fontaria Gray

Zinaria Chamberlin. Bull. Univ. Utah, **30**, 2, p. 4, 1939.

Chamberlin's inclusion of *virginiensis* (Drury) in his proposed *Zinaria* immediately invalidates that genus as *virginiensis* is the type of the genus *Fontaria*.

Fontaria brunnea (Bollman)

Fontaria virginiensis brunnea Bollman. Am. Nat., **21**, 82, 1887.
Zinaria urbana Chamberlin. Bull. Univ. Utah, **30**, 2, p. 5, 1939.

In the U. S. National Museum is one of Bollman's specimens from Madison, Wisconsin bearing the catalog number 294 and identified seemingly by Bollman, as a male of *Fontaria virginiensis brunnea*. A drawing made by the writer several years ago from this specimen shows one of the gonopods which is similar to Chamberlin's drawing of *urbana*. Other specimens of *brunnea*, identified by Bollman, are in the Museum collection received from Fort Snelling, Minn., apparently after his last published reference to the species. Also there is a male from Chicago, Ill. Although I was unable to locate the type specimen the other specimens from Fort Snelling, which was the type locality of *brunnea*, agreed with the specimens from Wisconsin. On the basis of comparison of the above specimens with Bollman's and Chamberlin's very brief descriptions cited above it seems that but a single species is involved and the older name, although proposed as a varietal designation, must be recognized.

Mimuloria georgiana (Bollman)

M. ducilla Chamberlin. Bull. Univ. Utah, **30**, 2, p, 7, 1939.

Comparison of a drawing of the gonopods and general notes on Bollman's type specimen in the U. S. National Museum with Chamberlin's description and drawing of *ducilla* indicates the above synonymy.

Numerous specimens were collected by Leslie Hubricht as follows: Monte Sano State Park, east of Huntsville, Madison Co., Alabama, July 22, 1939, A-4505; under logs, Newfound Gap, Great Smokey Mts. National Park, Swain Co., North Carolina-Sevier Co., Tenn. Aug. 10, 1939, A-5006; 3 females, A-5079, apparently this species, Torreya State Park, Liberty Co., Florida, July 29, 1939.

Cleptoria rileyi (Bollman)

C. macra Chamberlin. Bull. Univ. Utah, **30**, 2, p. 9, 1939.

Having seen Bollman's type of *rileyi* and made drawings of the gonopods it appears that Chamberlin's *macra* is a synonym of *rileyi* which would thus become the type of *Cleptoria* if that genus is to be accepted. Although I am not fully assured on this genus the name is used in the binomial for the present.

Pachydesmus retrorsus Chamberlin

Three males and two females, A-5056, collected in Monte Sano State Park, east of Huntsville, Madison Co., Alabama, July 22, 1939.

EURYURIDAE

With the recent establishment of the genus *Auturus* by Chamberlin (Bull. Univ. Utah, Vol. 32, No. 8, p. 7, 1942) two species which previously had been included in *Euryurus* were transferred to the new genus. As given in the present paper the genus *Euryurus* is composed of the type species, another species elevated from varietal rank, and a third species described as new.

Euryurus erythropygus (Brandt)

Many specimens, A-5032, from Shelta Cave, 1 mile north of Huntsville, Madison Co., Alabama, Aug. 5, 1939.

This species has the two terminal prongs of the gonopods slender, pointed, and subequal in length; the posterior margin of the keels is serrate-erose, as in *E. falcipes*.

Euryurus australis (Bollman)

Euryurus erythropygus australis Bollman. Proc. U. S. Nat. Mus., **11**, 346, 1888.

On the basis of the form of the gonopods alone Bollman's subspecies is entitled to specific standing. It appears to be most closely related to *E. falcipes* but Bollman stated "Upper branch of copulation foot five times as long as the lower" whereas in *falcipes* the lower branch is much the longest.

E. australis has not been reported since it was described and the original specimen has not been seen, in recent years, in the National Museum collection although careful search there might reveal its presence.

Euryurus falcipes spec. nov.

The male type, another male and three females, A-5078, from Torreya State Park, Liberty Co., Florida, July 29, 1939.

Length 27 to 30 mm., the males shorter than the females but relatively broader and distinctly less convex with lateral carinae extending farther outward. None of the specimens appear to be fully colored, the darkest having the body light reddish brown with the margins of

the keels and a large spot at the middle of the posterior margin of each segment colorless.

In direct comparison with *erythropygus* this species has the body of similar proportions, not more slender as is said of *australis;* the antennae are slightly more slender; first segment a little shorter with outer angles more acute; lateral keels with a similar tooth at the anterior corner, the outer margin as thick or thicker and slightly irregular, sometimes with two or three denticules, especially on the non-porifer-

Fig. 15. *Euryurus falcipes.* Gonopod.

ous segments, the posterior margin of the keels somewhat more evidently serrate-dentate than in *erythropygus:* segments 2 to 18 inclusive with a considerable area on each side, adjacent to the legs, densely beset with small but pronounced granules, as in that species.

Last segment with the produced portion as wide or even wider (male type) at the apex than at the base.

Gonopods as shown in figure 15.

Males with the sternum of the third and fourth legs with a tiny conic tubercle on each side; in *erythropygus* these tubercles are entirely lacking or are exceedingly small.

POLYDESMIDAE

Polydesmus branneri Bollman

Plate 1, figure 4

Proc. U. S. Nat. Mus., **10**, 620, 1887.

In 1887 Bollman reported a new species of milliped from Tennessee, giving it the above name. No technical description was presented, only a comparative diagnosis so brief and lacking in tangible details as to be almost valueless for systematic use. In subsequent remarks he stated that the most important differences between *P. branneri* and *P. serratus* Say, with which he compared it, were shown by the gono-

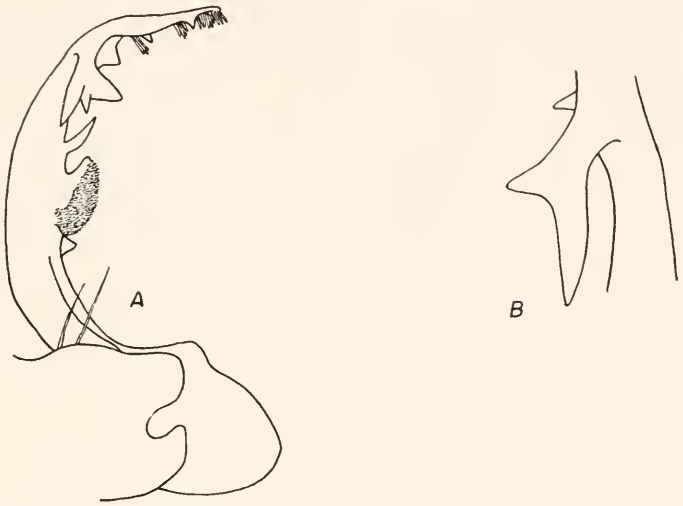

Fig. 16. *Polydesmus branneri*. *a*, Gonopod, lateral view showing the intermediate process trifid; *b*, Normal, bifid intermediate process.

pods but these differences were not described. Following the remarks was a short table giving several measurements of three specimens and containing the only exact data regarding the species. The type specimen was deposited in the U. S. National Museum collection but several attempts by the writer to locate it there have failed.

Bollman recorded this species from Tennessee and Georgia, and Chamberlin has recorded it from Knoxville, Tennessee without further

comment. Specimens are before me which, in view of their distribution and the form of their gonopods, I assume to be *P. branneri* and from them the following remarks have been prepared to aid future recognition of the species.

Males and usually female specimens have been examined from the following localities. Between Marshall and Hot Springs, N. C., Oct. 30, 1929, O. F. Cook; Etowah, Tenn., Nov. 4, 1929, O. F. Cook; Gatlinburg, Tenn., June 25, 1938, H. F. Loomis; Newfound Gap, Great Smokey Mts. National Park, Swain Co., N. C.—Sevier Co., Tenn., and from "The Loop", 10 miles south of Gatlinburg, Sevier Co., Tenn., Aug. 10, 1939, A-5007 & A-5039, Leslie Hubricht; Elk Garden Ridge, Jefferson National Forest, Va., Sept. 18, 1939, H. E. Ewing & A. B. Gurney.

Length 21 to 28 mm., the females apparently usually smaller than the males; dorsum flatter than in *serratus* and the outer margin of the keels less broadly rounded, the marginal teeth slightly more evident than in *serratus;* in other particulars the dorsum is not materially different from that species. Chief character for the separation of the two species is found in the gonopods; those of *branneri* having a prominent bifid arm on the outer side of each terminal joint half way between the fungiform tubercle and the apex; in *serratus* there is only a small angular lobe at this place. A gonopod of *branneri* is shown in figure 16, *a*, in which the intermediate arm is trifid although that on the opposite gonopod was of the normal bifid type shown in figure 16, *b*. The sterna of the fourth and fifth male legs are densely beset with long setae as in *serratus;* the prominent pair of large tubercles on the sterna of the sixth and ninth legs also are as in that species.

Polydesmus erasus spec. nov.

Plate 1, figure 5

The male type and three females, A-5053, from Monte Sano State Park, east of Huntsville, Madison Co., Alabama, July 22, 1939.

Diagnosis. Apparently closely related to *P. branneri* but of smaller size with somewhat less definite sculpturing and structural differences in the gonopods.

Description. Male and largest female each 22 mm. long, which is smaller than most specimens of *P. branneri;* the dorsum is slightly flatter and although its sculpturing is of the same general pattern it is less pronounced than in that species, the large tumid area at the base of the lateral keels in *P. branneri* being inconspicuous in *erasus;* in

general the posterior corners of corresponding keels are more acute and more produced than in *branneri* except on segments 17 to 19 inclusive, and on these segments the width of the posterior margin between the produced keels is greater in *crasus* than in *branneri;* lateral keels with outer margin less rounded than in *branneri* and with much smaller teeth, when teeth are present.

Gonopods as shown in figure 17; differing in several particulars from those of *branneri;* three triangular lobes or teeth are seen to be present along the inner side of the terminal joint in *crasus* but there are four

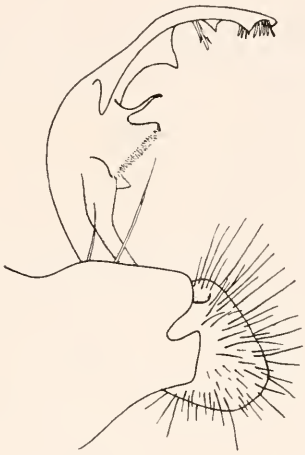

Fig. 17. *Polydesmus crasus.* Gonopod, lateral view.

such prominences in *branneri*, one of them being obscured in the illustration by the trifurcate (normally bifurcate) structure on the outer margin of the joint.

Sternum of the sixth male legs with a large tubercle on each side but these tubercles are much less hairy than those in *branneri.*

POLYDESMUS sp.

Five young specimens, A-5765, from Wildwood Cave, 1 mile south of Wildwood, Pulaski Co., Missouri, Sept. 21, 1940; one young specimen, A-5049, Monte Sano State Park, east of Huntsville, Madison Co., Alabama, (no date).

Antriadesmus gen. nov.

Diagnosis. Although males are not known it appears that this genus may be quite closely related to the tropical American *Cryptogonodesmus.* The most obvious differences from that genus are the greater number of setae in the three rows on each segment and the additional tooth on the outer margin of the keels.

Description. Size small, the body slender, about ten times as long as broad; composed of 20 segments; lacking pigmentation; dorsum strongly convex; lateral carinae narrow, scarcely exceeding the sides of the body.

Head subglobular, setose; as wide as the diameter of the body; the vertex without a median furrow; antennae long, submoniliform, joint 6 much exceeding the other joints in length and thickness.

Segment 1 considerably narrower than the ensuing segments or the head; almost semicircular, with the back margin slightly convex; a series of erect setae completely encircling the segment, there being about 14 setae behind the front margin and about 8 in advance of the back margin; central area of the segment with 10 or 12 scattered setae.

Ensuing segments with three transverse rows of setae on small and rather indistinct tubercles, there being about ten setae in each row; across the middle of each segment, between the first and second row of setae, is a broad distinct depression; posterior corners of the segments not produced into lobes exceeding the back margin; lateral carinae of segment 2 with five teeth, the ensuing nonporiferous segments with four prominent teeth on the outer margin; poriferous segments with five lateral teeth; pores in normal arrangement, opening just above the sinus formed between the last two marginal teeth.

Last segment with only a single row of non-tuburculate setae; apex produced into a mucro exceeding the anal valves; the latter with thin raised margins; preanal scale elliptical, the front and back margins similarly convex.

Legs projecting beyond the sides of the body by several joints; sterna broad, low and nearly flat; the anterior sternum of each mid-body segment separated from the posterior sternum by a broad and shallow transverse depression.

Type. *A. fragilis* spec. nov.

ANTRIADESMUS FRAGILIS spec. nov.

Plate 1, figure 6

Female type and another female, A-5365, from White's Cave, near Mammoth Cave postoffice, Edmonson Co., Kentucky, Aug. 30, 1939.

Body colorless, 6.5 mm. long and approximately one tenth as wide; sides parallel from segment 2 to 18; dorsum strongly convex with the very narrow lateral keels evenly continuing the descent.

Head subglobular, as wide as the remainder of the body; the large evenly rounded vertex without a median furrow but beset with erect setae as is the surface in front of it and that of the cardo of each mandible; antennae long, as shown in figure 18, *a;* joints 1 and 7 shortest, subequal; joints 2 to 5 of intermediate length, much exceeded in length and thickness by joint 6.

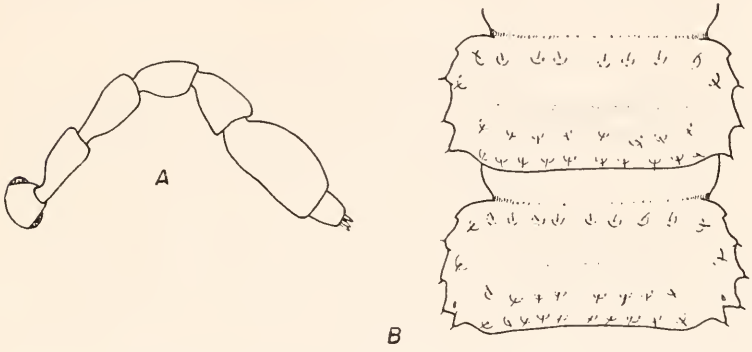

Fig. 18. *Antriadesmus fragilis.* *a*, Antenna; *b*, Segments 11 and 12, dorsal view.

First segment considerably narrower than the head or the other segments but distinctly longer than segments 2, 3 or 4 and about equal to the others; shape almost semicircular, with the front margin evenly rounded and the back margin slightly convex; a series of 14 erect setae behind the front margin and a series of 8 setae in advance of the back margin, the median surface with 10 to 12 scattered setae.

Ensuing segments each with a broad, distinct, transverse median depression as shown in figure 18, *b;* the front half of the metazonite with a transverse anterior row of about 10 setae borne on small tubercles, the posterior half of the metazonite crossed by two similar

rows of setose tubercles, one near the posterior margin but never projecting beyond it, the other at the posterior fourth of the segment; one or two additional setae are on the lateral carinae removed from the dorsal series; lateral carinae projecting directly outward a very short distance from the sides of the body, those at the extremities produced neither forward nor backward; outer margin of carinae of segment 2 and all poriferous segments with five prominent acute teeth, the remaining non-poriferous carinae with four teeth; on all carinae all teeth, except the first, have an apical seta; posterior corner of the carinae not produced caudad beyond the back margin of the segment which is almost straight across or even somewhat convex; penultimate segment with sides rapidly converging caudally, suddenly reducing the width of the body.

Last segment with the apex produced beyond the anal valves and somewhat deflexed.

Brachydesmus pallidus Loomis

Many specimens, A-5023, from Crystal Caverns, 1 mile north of Strasburg, Shenandoah Co., Virginia, Aug. 14, 1939; 3 specimens, A-4895, on boards at the landing in Alexander's Caverns, near Naginey, Mifflin Co., Pennsylvania, Aug. 20, 1939; many specimens, A-5020, in Arch Springs Cave, 7.5 miles southwest of Water Street, Blair Co., Pennsylvania, Aug. 21, 1939.

All males in the above collections exhibit a character not mentioned in the original description of the species. Legs 14 to 17 inclusive have the second joint much more swollen than on any of the other legs and there is an almost circular area of short stiff hairs on the ventral face of the joint.

PLATE

PLATE

Fig. 1. *Scoterpes austrinus*, dorsal view of male. x 10
Fig. 2. *Scoterpes austrinus*, lateral view of female. x 10
Fig. 3. *Desmoniella curta*, lateral view of female. x 10
Fig. 4. *Polydesmus branneri*, dorsal view of male. x 6
Fig. 5. *Polydesmus erasus*, dorsal view of female. x 6
Fig. 6. *Antriadesmus fragilis*, dorsal view of female. x 10

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Bulletin of the Museum of Comparative Zoölogy
AT HARVARD COLLEGE
VOL. XCII, No. 8

NEW SPECIES OF THE GENUS *HADROPODA* SUFFRIAN FROM THE WEST INDIES

BY DORIS H. BLAKE

WITH FOUR PLATES

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No. 8. — *New Species of the Genus* Hadropoda *Suffrian from the West Indies*

By Doris H. Blake

In 1866 Suffrian[1] described a new genus and species of the Halticini from Cuba under the name *Hadropoda ferruginea*. *Hadropoda* was a manuscript name given by Ahrens, an old teacher of Suffrian's. Suffrian discussed its general position in the light of Illiger's group Oedipodes and Hamlet Clark's Catalogue of Halticidae[2], and concluded that while it somewhat resembled Clark's species *Omototus tuberculatus* and *O. dohrnii*, it was generically distinct. In Gemminger and Harold's Catalogue *Hadropoda* is synonymized with *Omototus* and the single Cuban species in Leng and Mutchler's Coleoptera of the West Indies is listed as *Omototus ferrugineus* Suffrian.

There have been accumulating in collections other species from the West Indies closely related to Suffrian's. In Wolcott's List of the Insects of Puerto Rico[3] are the names *Omototus ferrugineus*, *Hypolampsis* sp. and *Hypolampsis inornata* Jac., the last originally described from Mexico. Although I have not been able to examine the specimen, I doubt very much if it is the same as the Mexican species. Jacoby has described one species of the West Indian group from Grenada and St. Vincent under the name *Hypolampsis annulicornis*.[4]

Recently P. J. Darlington has collected a considerable number of species from Hispaniola and Puerto Rico and one from Cuba. W. A. Hoffman and Harold Morrison have collected species from Hispaniola and Puerto Rico, and R. G. Oakley has devoted particular attention to the food plants of several species that he has collected and observed in Puerto Rico. Lately a number of species have been sent in from Dominica, British West Indies, by R. G. Fennah.

I have spent considerable time going over Clark's genera as represented in the Bowditch collection at Cambridge, but can find nothing there very close to this group from the West Indies. Certain species described by Clark under *Hypolampsis*, such as *H. sylvatica*, *fallax* and *vicina*, the first two from Brazil, the last from Caracas, appear more closely related to the West Indian group in question than do the rest, but, as is also true of *Omototus*, these have a much knobbier prothorax and heavy elytral ridges about the scutellum, and they are generally

[1] Suffrian, Arch. f. Naturg., vol. 32, pp. 174–6, 1866.
[2] Clark, Catalogue of Halticidae, pp. xii, 232 1860.
[3] Wolcott, Journ. of Agr., Univ. of Puerto Rico, vol. xx, no. 1, p. 273, 1936.
[4] Jacoby, Trans. Ent. Soc. London, pt. III, p. 274, 1897.

larger. Clark states in his Catalogue that the genus *Hypolampsis* "presented serious difficulties" and was "a very difficult group", and he was unable to satisfy himself as to the "exact limits of any subdivision". In view of this, it seems justifiable to revive Suffrian's name for the group in the West Indies, which is, with the exception of three or four species rather doubtfully included in it, a fairly homogeneous group apparently confined to the islands.

One species, *H. glabra*, which is included in this group, is superficially more like an *Oedionychis* in being glabrous on the upper surface and in having a thorax not at all depressed but smoothly rounded and somewhat convex. There is also a slight emargination of the edge near the apex of the hind tibia which is not present in any other species here described. However, in its striate-punctate elytra sprinkled with small dark spots, it resembles closely the other spotted species. Two species, *H. hugonis* and *barberi*, are distinctly different and appear more closely related to the North American *Hypolampsis pilosa* Ill., which group, by the way, is not closely akin to the South and Central American species of *Hypolampsis*. Clark in the introduction to his Catalogue mentions *H. pilosa* as being "another modification of form." Until someone can study these groups as a whole, they should not be too much subdivided into genera.

Description of the Genus *Hadropoda*

Small (2 — 5 mm. long), yellowish or reddish brown beetles, usually pubescent, the head and prothorax of about the same width, the prothorax being usually wider than long, and the elytra considerably wider than the prothorax. The elytra are striate-punctate and usually with a basal callosity and long incurving intrahumeral depression. The hind claw is globose.

The head is usually densely punctate and pubescent over the occiput and without any marked depressions, the frontal tubercles being lightly marked and the interantennal area not much produced. The eyes are somewhat variable in size, in some species so large that the interocular space is about half the width of the head, in others, smaller with wider interocular space. The antennae are usually more than half as long as the body, filiform, the 3rd, 4th, and 5th joints subequal with the 5th often the longest. In a few species the antennae do not extend much below the humeri and the last five joints thicken towards the end so that they are as broad as long. The prothorax, scarcely any wider than

the head, is usually a third or fourth wider than long, with the sides nearly straight or slightly contracted below the middle, with a small, subacute tooth bearing a seta apically and basally. In only one species is the thorax approximately as long as wide. The surface is densely and finely punctate and usually covered with fine, appressed pubescence. There are normally two small callosities in the middle nearer the anterior margin and a broad, shallow depression on either side basally. This surface formation is present to a more or less marked degree in nearly all the species. The elytra are much wider than the prothorax, usually elongate oblong, occasionally somewhat ovate, with small, sharp humeri and usually a deep incurving intrahumeral depression between the humerus and the more or less developed basal callosity. One species, *H. barberi*, is without humeri, being wingless. In a few species only the basal elevation is not marked. The elytra are strongly striate-punctate, the interstices often appearing somewhat costate, and are more or less densely pubescent, there being often present in addition to the closely appressed hairs, scattered long, dark, suberect hairs. In coloring, the elytra are yellowish or reddish brown, sometimes with numerous small and quite regularly placed dark spots, and more frequently an irregular median fascia or remnants of this and another near the apex. Occasionally there are markings on the basal callosity. Beneath, the epipleura are wide but do not persist to the apex of the elytra. The anterior coxal cavities are closed. The posterior femora are much thickened, the posterior tibiae are grooved and at the end armed with a small spur. The last claw is globose. The first tarsal joint of the anterior and middle legs in the male is enlarged.

Hadropoda ferruginea Suffrian is designated as type of the genus.

Key to the Species

1. Antennae with the five apical joints thickened much more than basal ones, the fifth and sometimes sixth conspicuously white, remainder darker 2
   Antennae with the apical joints not greatly thickened and not having the fifth or sixth joints conspicuously white with the rest darker 3
2. About 3 mm. in length; elytra with humeral prominences, elytral markings usually with metallic lustre; Dominican Republic . . . . . *hugonis* n. sp. (p. 439)
   About 2 mm. in length; elytra without humeri, wingless, elytral markings without metallic lustre; Puerto Rico . *barberi* n. sp. (p. 440)

3. Prothorax approximately as long as wide with only faint surface depressions ..... *stenotrachela* n. sp. (p. 438)
   Prothorax always considerably wider than long, usually with well marked surface depressions 4
4. Elytra with numerous small round dark spots 5
   Elytra without spots or having a few large irregular darker areas or remnants of bands usually across the middle or near the apex. 12
5. From 4 to 5.5 mm. long; prothorax with large, conspicuous but shallow excavations 6
   Smaller, from 2.5 to 3.5 mm. long; prothorax not so conspicuously excavate although usually somewhat depressed laterally and basally 7
6. Spots on elytra distinctly elevated, forming small warts, elytral pubescence curling; Puerto Rico ..... *eugeniae* n. sp. (p. 423)
   Spots on elytra not conspicuously elevated, not warty, elytral pubescence not curling; Dominican Republic ..... *darlingtoni* n. sp. (p. 420)
7. Antennae reddish brown with apical joints becoming gradually thicker and darker; the dark elytral spots without pubescence, the rest of the elytra covered with short rather scanty white hairs without longer erect hairs ..... *glabroguttata* n. sp. (p. 421)
   Antennae with only the last two joints dark or with the base of each joint darker or entirely pale; elytra either entirely glabrous or covered throughout with yellowish pubescence, and sometimes with longer erect hairs 8
8. Glabrous, without pronotal depressions; Dominica, B.W.I. ..... *glabra* n. sp. (p. 424)
   Pubescent, the pronotum having more or less marked depressions 9
9. Antennae with the base of each joint dark; Puerto Rico ..... *varicornis* n. sp. (p. 423)
   Antennae either entirely pale or with the apical joints darker. . 10
10. Very densely pubescent, elytral spots rather sparse and irregularly placed amid other larger dark areas ..... *comosa* n. sp. (p. 419)
    Not densely pubescent, the small elytral spots numerous and regularly placed, only a trace of other large dark areas in most specimens 11
11. Between 2 and 3 mm. long, the elytra finely pubescent without longer coarse dark hairs; Puerto Rico ..... *oakleyi* n. sp. (p. 422)
    Between 2.5 and 3.5 mm. long, the elytra finely pubescent with sparse long dark hairs; Dominican Republic. *guttata* n. sp. (p. 419)

12. Elytra with small, wartlike elevations, usually somewhat irregularly placed along interstices near the suture and at apex.....13
Elytra without wartlike elevations.....16
13. Head very sparsely pubescent and obsoletely punctate over occiput
corrugata n. sp. (p. 425)
Head densely pubescent, this pubescence obscuring punctation.14
14. Elytral pubescence curling, warts very numerous, appearing like small raised spots; 4.5 mm. in length.....*eugeniae* n. sp. (p. 423)
Elytral pubescence not curling, warts not numerous, smaller; 3.5 mm. in length.....15
15. Elytra without long erect dark hairs; Puerto Rico.....
rugosa n. sp. (p. 427)
Elytra with scattered long erect dark hairs; Dominican Republic.
verrucosa n. sp. (p. 428)
16. Antennae dark with joints nine and ten and apices of other joints paler; Grenada and St. Vincent.....*annulicornis* Jac.
Antennal joints nine and ten and apices of other joints not varicolored.....17
17. Elytral pubescence curling in various directions so that it forms a pattern on the elytra varying in different lights.....18
Elytral pubescence not curling in various directions and not forming a pattern by its shadings.....20
18. Aedeagus long and narrow and somewhat spoonshaped at the end when viewed from above; last one or two antennal joints usually dark; shape decidedly elongate oblong....*hoffmani* n. sp. (p. 435)
Aedeagus not spoonshaped nor notably narrow; antennae entirely pale; shape oblong.....19
19. Antennae unusually long, reaching below the middle of the elytra; Cuba.....*ferruginea* Suffrian
Antennae reaching to the middle of the elytra; Dominican Republic
crispula n. sp. (p. 426)
20. Large, 3 to 4 mm. in length; antennae entirely pale or dark, not with some joints dark and rest pale.....21
Smaller, 1.8 to 3.3 mm. in length; antennae with the last joints usually darker.....23
21. Head coarsely and densely punctate and glabrous; antennae very long and slender; elytra with an irregular dark fascia.....
calva n. sp. (p. 426)
Head with the punctation obscured by pubescence; antennae not extending below the middle of the elytra, moderately robust; elytra without conspicuous dark markings.....22

22. Elytral pubescence not so thick as to obscure at all the punctation; prothorax very little depressed; Puerto Rico . *tabebuiae* n. sp. (p. 437)
Elytral pubescence very dense, somewhat obscuring the punctation; prothorax with the usual basal depressions; Dominican Republic . . . . . *flavicoma* n. sp. (p. 436)

23. Antennae short, usually not reaching much below the humeri, the last two joints dark and thick; Puerto Rico . *morrisoni* n. sp. (p. 433)
Antennae reaching well below the humeri, the last two joints if dark not conspicuously thicker 24

24. Punctures of elytral striae large, making the striate rows as wide as the interstices 25
Punctures of elytral striae not so large as to make the striate rows as wide as the interstices 26

25. Third antennal joint not much, if any, longer than second; Haiti *gracilenta* n. sp. (p. 429)
Third antennal joint nearly twice as long as second; Dominica . . . *dominicae* n. sp. (p. 438)

26. Very lightly pubescent, the occiput appearing almost glabrous, punctation on occiput indistinct and obsolete . *pallida* n. sp. (p. 435)
Occiput distinctly pubescent and densely punctate 27

27. Antennae with last two or three joints dark 28
Antennae with only the last joint dark 31

28. Elytra with long suberect dark hairs in addition to the shorter closely appressed pubescence . . . . . *robusta* n. sp. (p. 431)
Elytra without longer suberect dark hairs 29

29. About 3 mm. in length, elytra with a median dark band; Pico Turquino, Cuba . . . . . *turquinensis* n. sp. (p. 429)
Smaller (1.8–2.8 mm.), elytra with dark markings at base, middle, and sometimes at apex 30

30. Elytra densely pubescent; Dominican Republic . . . . . *constanzae* n. sp. (p. 432)
Elytra lightly pubescent; Dominica, B.W.I. . *fennahi* n. sp. (p. 434)

31. Basal callosities and humeri not prominent, with little trace of depression between or below them . . . . . *clachia* n. sp. (p. 431)
Basal callosities well marked with a transverse depression below them . . . . . *minuta* n. sp. (p. 430)

Hadropoda comosa spec. nov.

Plate 1, Fig. 2

About 3 mm. in length, densely clothed with pale pubescence, pale yellow brown, elytra with irregularly placed small dark brown spots and larger dark areas, one extending from the edge partly across the middle and another nearer the apex.

Head with interocular space more than half its width, occiput so densely pubescent as to make punctation invisible. Antennae extending about half way down elytra, entirely pale. Prothorax about a fourth wider than long, scarcely wider than head, sides a little constricted before base; surface densely covered with pale appressed pubescence entirely covering punctation; two small median callosities and a wide depression on either side below the middle. Elytra covered with pale appressed pubescence so that the rows of punctures become indistinct before the apex and on sides; scattered long dark hairs arising from the dark spots, these small dark spots scattered irregularly over elytra; a larger dark area on the side and at the middle and another nearer the suture towards the apex; humeri well marked, a deep intrahumeral depression and a broad basal callosity. Length 3.1 mm., width 1.6 mm.

Type male, Museum of Comparative Zoölogy Type No. 25868.

Type locality. Loma Rucilla and mountains north, Dominican Republic, collected in June 1938 at 5–8000 ft. by P. J. Darlington.

Remarks. This is one of several species whose elytra are sprinkled with small dark spots. It differs from the other spotted species in being very densely pubescent and in having larger dark areas on the elytra.

Hadropoda guttata spec. nov.

Plate 1, Fig. 7

About 3 mm. in length, lightly pubescent, faintly shining, yellow brown, the last one or two antennal joints dark, the elytra thickly covered with small dark brown spots.

Head with interocular space a little more than half the width, densely but shallowly punctate over occiput and below eyes, shining, finely pubescent. Antennae extending to the middle of the elytra, gradually thickening, joints 3, 4, and 5 long and slender, the last one or two joints dark. Prothorax about a fourth wider than long, not much wider than

the head, with sides slightly incurved near the base. Surface densely and shallowly punctate and covered with fine pale pubescence, a wide but shallow depression on either side in basal half and two small median callosities anteriorly. Elytra with fine but distinct striate punctures, small, well marked humeri and moderately prominent basal callosities; surface shining, lightly pubescent, with scattered long erect dark hairs arising chiefly from the small dark spots; the dark spots somewhat regularly placed in alternate rows between the striate punctures, in some specimens traces of darker areas in the middle, at the side and at the apex. Beneath chestnut brown in part or entirely. Length 2.5–3.5 mm., width 1.5–1.8 mm.

Type male and 7 paratypes (5 female, 2 male) Museum of Comparative Zoölogy Type No. 25869. Two paratypes (male and female) U. S. National Museum Type No. 56142.

Type locality. Loma Vieja, south of Constanza, at about 6000 ft., Dominican Republic, collected in August 1938 by P. J. Darlington.

Other localities. Foothills of Cordillera Central, south of Santiago, Dominican Republic, collected in June 1938 by P. J. Darlington.

Remarks. This species is distinguished from the other spotted species by the longer suberect elytral hairs, which arise chiefly from the dark spots. The preceding species is much more densely pubescent.

Hadropoda darlingtoni spec. nov.

Plate 1, Fig. 4

About 4 mm. in length, finely pubescent, feebly shining, yellow or reddish brown, pronotum more or less darkened in places and with conspicuous though shallow depressions; elytra dotted with small dark spots; antennae entirely pale.

Head with interocular space about half its width; densely punctate over occiput and below eyes; tufts of longer hairs over vertex and front and on inner side of eyes with the occiput usually glabrous. Antennae extending well down on the elytra, in some specimens more than half way, entirely pale. Prothorax about a fourth wider than long, with the sides slightly constricted below the middle; surface uneven with a conspicuous median depression anteriorly and on either side both anteriorly and basally wide lateral depressions; finely, densely but obsoletely punctate and covered with short appressed yellowish pubescence; color variable, usually deeper, sometimes piceous on the sides and in the middle. Elytra with well marked striae and a deep transverse depres-

sion below the basal callosity; the dark spots thickly sprinkled over elytra and tending to be somewhat raised; surface shiny and covered with very fine short yellow pubescence interspersed with long erect hairs, the latter not abundant but scattered; color usually deep yellowish or reddish brown, with very numerous small dark brown spots between the striae in alternate rows, and in most specimens a paler reddish brown rather indefinite area along the side and down the middle. Undersurface deeper in coloration on the metasternum. Length 3.9–4.4 mm.; width 1.9–2.2 mm.

Type male and 3 paratypes (2 male, 1 female) Museum of Comparative Zoölogy Type No. 25870. Two paratypes (male and female) U. S. N. M. Cat. No. 56143.

Type locality. Loma Rucilla and mountains north, 5–8000 ft., Dominican Republic, collected in June 1938 by P. J. Darlington.

Remarks. This species is one of the two largest of the spotted species. The other large spotted species is from Puerto Rico and has the spots so much raised as to form small warts. *H. darlingtoni* differs from *H. guttata* in being considerably larger, and in having entirely pale antennae. It differs from *H. comosa* in being less pubescent.

Hadropoda glabroguttata spec. nov.

Plate 1, Fig. 1

About 3 mm. in length, reddish or yellowish brown, faintly shining, with pale not very dense pubescence, the elytra with deep reddish brown spots, these not raised or pubescent.

Head alutaceous, closely punctate, and except for lower front covered with pale pubescence; interocular space more than half width of head. Antennae in some specimens of the larger females scarcely reaching the middle of the elytra, usually yellowish or reddish brown with the outer joints thickening and darkening, 5th joint longest. Prothorax not much wider than head, about a third wider than long, sides slightly constricted behind the middle; finely and densely punctate and with closely appressed pubescence; two slight median callosities anteriorly and shallow depressions on either side at the base. Elytra with only slight basal callosities near the scutellum and a short intrahumeral depression; surface shining beneath the not dense and short pubescence, no longer darker erect hairs as in the preceding species; yellowish or reddish brown with often a darker area on basal callosities, sometimes a dark area near the middle and many small dark spots on alternate

interstices, these darker places shining and without hairs. Length 2.7–3.5 mm.; width 1.3–1.7 mm.

Type male and 16 paratypes (9 male, 7 female) Museum of Comparative Zoölogy Type No. 25871. 2 paratypes (male and female), U. S. N. M. Cat. No. 56144.

Type locality. Loma Rucilla, alt. 8–10,000 ft., Dominican Republic, collected in June 1938 by P. J. Darlington.

Other localities. Loma Vieja, south of Constanza, about 6000 ft., Constanza to Jarabacoa, alt. 2–4000 ft., Dominican Republic, collected in Aug. 1938 by P. J. Darlington.

Remarks. The darker antennae and the absence of erect elytral hairs coupled with the smooth glabrous spots on the elytra distinguish this species from the other spotted ones.

Hadropoda oakleyi spec. nov.

Plate 1, Fig. 6

Between 2 and 3 mm. in length, finely pubescent, pale yellow brown with the last two or three antennal joints dark and with numerous small dark elytral spots and usually a faint trace of median and sometimes basal fascia, elytral striation deep.

Head with interocular space about half its width, very densely punctate and finely pubescent, usually entirely pale but sometimes with a dark median streak. Antennae not reaching the middle of the elytra, apical joints somewhat thickened and the last two, sometimes three, dark. Prothorax about a third wider than long with sides nearly straight, surface densely punctate and pubescent with the usual basal depressions. Elytra with small humeral prominences and faint transverse depression behind base, the usual basal callosities not well developed; striation deep and punctures unusually large and distinct making the striation as wide as the interstices and producing a somewhat costate effect because of the depth of the striae; lightly pubescent; pale with numerous small dark spots and a trace of paler median and sometimes basal areas suggestive of fasciae. Body beneath entirely pale and shining. Length 2.3–2.8 mm.; width 1.1–1.3 mm.

Type male and 28 paratypes, U. S. N. M. Cat. No. 56145. 2 paratypes in the Museum of Comparative Zoölogy.

Type locality. Natale Finca, Yauco, Puerto Rico, collected on *Eugenia* sp. July 10, 1934, by R. G. Oakley.

Remarks. Hadropoda oakleyi is distinguished from the other spotted

species by its smaller size, its rather short antennae and deep, coarsely punctate elytral striae. It closely resembles *H. guttata* but is smaller, with fewer elytral spots, and with a shorter aedeagus.

Hadropoda varicornis spec. nov.

Plate 1, Fig. 5

2.7 mm. in length, oblong, densely pubescent, pale yellow brown, the base of each antennal joint dark and the elytra thickly speckled with small dark spots and the legs very faintly banded; prothorax a little larger than in the other spotted species.

Head with interocular space slightly more than half its width, densely punctate and covered with short pubescence, a dark median streak over occiput and about the lower side of the eyes. Antennae not extending to the middle of the elytra, the base of each joint dark. Prothorax about a third wider than long, slightly wider anteriorly, sides a little incurved before base; rather convex with shallow lateral and median depressions; surface densely punctate and covered with short dense golden pubescence. Elytra with striate punctures coarse and well marked under the dense pubescence; numerous small dark brown spots on alternate interstices and a larger irregular area or fascia across the middle. Body beneath with darker sides on head, prosternum, breast and abdomen, the legs, both femora and tibiae with very light traces of banding. Length 2.7 mm., width 1.2 mm.

Type female U. S. N. M. Cat. No. 56146.

Type locality. Ponce, Puerto Rico, Torres Finca, collected on *Oeotea* sp. Aug. 24, 1933 by R. G. Oakley.

Remarks. This is the only species having spotted elytra combined with varicolored antennae. It is more robust than *H. oakleyi.*

Hadropoda eugeniae spec. nov.

Plate 2, Fig. 10

About 4.5 mm. in length, reddish brown, covered with curly golden pubescence, the elytra with numerous small warty protuberances, frequently darker in color.

Head with interocular space about half its width, densely and coarsely punctate over occiput and front and with a slight median ridge, covered with long golden pubescence. Antennae long, slender, and

extending about to the middle of the elytra, not thickened much towards apex, and entirely reddish brown, 3rd, 4th and 5th joints long. Prothorax about a fourth wider than long, slightly wider anteriorly and constricted before the base; surface densely punctate and with pronounced elevations on either side anteriorly and wide lateral depressions; covered with dense golden pubescence, closely appressed. Elytra with well marked humeral and basal callosities and a deep incurving intrahumeral depression; surface marked by numerous small raised warty spots, on alternate interstices, and covered by a dense and in places coppery-golden pubescence curling in various directions. Body beneath deep reddish brown or piceous, lightly pubescent; anterior femora sometimes darker at apex. Length 4.5–4.7 mm.; width 2.2–2.3 mm.

Type male and 2 paratypes (male and female) U. S. N. M. Cat. No. 56154. One paratype (male) in the Museum of Comparative Zoölogy.

Type locality. Natale Finca, Yauco, Puerto Rico, collected Aug. 30, 1934 by R. G. Oakley, on *Eugenia* sp.

Remarks. The spots on the elytra of this species are raised so as to give it a warty and yet spotted appearance. It is an unusually large species, fully as large as *H. darlingtoni* but, unlike *darlingtoni*, with dense curling pubescence.

Hadropoda glabra spec. nov.

Plate 1, Fig. 3

2.7 mm. long, glabrous, head and thorax finely punctate and alutaceous, elytra shining, pale yellow brown, and with numerous small dark spots on apical half. Antennae not extending below the humeri.

Head with interocular space more than half its width, eyes small, head rounded over the occiput and without depressions; frontal tubercles barely marked, finely alutaceous and with fine sparse punctures. Antennae not extending below the humeri, the last joint slightly thickened and darker. Prothorax nearly a third wider than long, smoothly rounded with arcuate sides; surface alutaceous and with distinct but not coarse or dense punctures. Scutellum covered with dense silvery pubescence. Elytra shining, entirely glabrous, the striate punctures well marked, especially in basal half; the humeri sharp and prominent; a slight transverse depression behind the basal callosities; pale yellow with small scattered dark spots on apical half. Body beneath pale, shining, very sparsely and lightly pubescent, the hind

tibiae with a slight but distinct scalloped out edge next to the apex, the usual apical spur being present and the shallow groove along the tibia. Length 2.7 mm.; width 1.2 mm.

Type female U. S. N. M. Cat. No. 56147.

Type locality. Saltoun Estate, Dominica, British West Indies, 800 ft. altitude, collected June 30, 1941 by R. G. Fennah.

Remarks. This species is doubtfully included in the group. While it possesses the usual striate elytral punctation and resembles the small spotted species in its markings, the lack of any pubescence except on the scutellum and the smoothly rounded prothorax that has no depressions or irregularities, and the small scalloped-out edge of the hind tibiae separate this species from all the others.

Hadropoda corrugata spec. nov.

Plate 2, Fig. 12

About 4 mm. in length, broadly oblong, shining somewhat beneath the short, closely appressed, pale pubescence, deep reddish brown or even darker, the thorax frequently darkened in the middle and on the sides, the elytra irregularly costate with small elevations suggestive of warts.

Head with interocular space about a half its width, densely but obsoletely punctate over occiput, sparsely pubescent except on inner front near the eyes; usually shading into dark brown on occiput and about mouthparts. Antennae extending about half way down elytra or longer; gradually deepening in color towards the apex, last joint dark. Prothorax about a fourth wider than long, sides slightly constricted behind the middle, surface with a small callosity on either side near the middle and wide but shallow lateral depressions; finely punctate and covered with short, closely appressed pubescence; reddish brown in color deepening in middle and on the sides to a darker brown. Elytra broad, somewhat depressed with a basal callosity near the scutellum; the interstices with traces of irregular costae or slight ridges suggesting warts; shining deep reddish brown with a short light pubescence. Length 4–4.4 mm.; width 1.9–2.2 mm.

Type male and 1 paratype (female) Museum of Comparative Zoölogy Type No. 25872. 1 paratype (male) in National Museum, U. S. Nat. Mus. Cat. No. 56148.

Type locality. Loma Rucilla and mountains north, Dominican Republic, 5–8000 ft., collected in June 1938 by P. J. Darlington.

Remarks. This is one of the larger species, characterized by its large eyes, short, closely appressed pubescence, and the somewhat warty or irregularly costate elytra.

Hadropoda crispula spec. nov.

Plate 4, Fig. 29

About 3 mm. in length, oblong, pale yellow brown, covered with silky pale pubescence, the pubescence on the elytra curling so as to produce shadings in different lights.

Head with interocular space about half its width, densely punctate on occiput and pubescent. Antennae extending about to the middle of the elytra, entirely pale, joints 3, 4 and 5 long and approximately equal. Prothorax barely a third wider than long with sides nearly straight, very slightly incurved behind the middle; finely and densely punctate and covered with fine appressed pubescence; the usual median callosities and lateral depressions. Elytra with basal callosities and humeri well rounded; pale yellow, faintly shining through the dense pale pubescence, the pubescence curling in various directions so as to produce a shading in different lights. Length 3–3.5 mm.; width 1.6–1.7 mm.

Type male and 4 paratypes (all males), Museum of Comparative Zoölogy Type No. 25873. 1 paratype (male) in National Museum, U. S. Nat. Mus. Cat. No. 56149.

Type locality. Foothills of Cordillera Central, south of Santiago, Dominican Republic, collected in June 1938 by P. J. Darlington.

Remarks. The entirely pale yellow brown color and the curly appearance of the pubescence on the elytra distinguish this from related species.

Hadropoda calva spec. nov.

Plate 4, Fig. 26

About 3.5 mm. long, head glabrous, otherwise covered with pale appressed pubescence and with a few long suberect elytral hairs; pale yellow brown with a dark occipital streak, sometimes a darker median and lateral streak on the prothorax and an irregular median fascia and a dark streak on the humeri and often on the basal callosities of the elytra.

Head with interocular space about half its width, densely and dis-

tinctly punctate on the occiput, smooth and shining over lower front, entirely lacking pubescence; occiput usually deeper brown with often a dark median streak. Antennae long and slender, extending well below the middle, 3, 4, and 5th joints long, entirely pale. Prothorax about a third wider than long, a little wider than head, with the sides somewhat rounded; densely punctate and covered with short, pale, appressed pubescence; the usual median channel and shallow lateral depressions; pale, sometimes with sides dark and in one specimen with a dark median streak. Elytra considerably wider than prothorax with deep striae making the interstices appear somewhat costate; a pronounced basal callosity and well marked humeral prominence on each elytron; surface shining beneath the pale pubescence; pubescence mostly appressed but scattered erectish long dark hairs along sides and at apex, and along the striae longer pale hairs somewhat erectish; pale yellow with deeper brown streaks often on humeri and basal callosities and an irregular dark band across the middle. Length 3.5 mm.; width 1.9 mm.

Type male, Museum of Comparative Zoölogy Type No. 25874. 1 paratype (female) in National Museum, U. S. N. M. Cat. No. 56150.

Type locality. Mt. Diego de Ocampo, Dominican Republic, 3–4000 ft. altitude, collected in July 1938 by P. J. Darlington.

Other localities. Jarabacoa, Dominican Republic, 1500–4000 ft. altitude, collected in August 1938 by P. J. Darlington.

Remarks. Hadropoda calva is distinguished by its entirely glabrous head, long slender antennae, wide prothorax and rather zigzag dark elytral fascia.

Hadropoda rugosa spec. nov.

Plate 2, Fig. 11

3.5 mm. in length, oblong, faintly shining through the dense pale pubescence, yellow brown with deeper reddish brown areas on the elytra at the basal callosity and about the middle; slight warty elevations along the dorsal interstices and near the apex of the elytra.

Head with interocular space about half its width; occiput densely punctate and covered with dense yellow pubescence, except for the yellowish brown mouthparts head a deep reddish brown. Antennae missing. Prothorax nearly a third wider than long, not much wider than head, with sides slightly incurved behind the middle; surface rugosely punctate and densely covered with yellow appressed pubescence; the usual wide, shallow lateral depressions, entirely pale.

Elytra with well marked basal callosities and small humeri, and in addition a row of warty elevations along interstices, these most pronounced in the 1st, 3rd and 5th interstices and near the apex; surface faintly shining through the pale pubescence, no long erect dark hairs. Length 3.5 mm.; width 1.4 mm.

Type male, Museum of Comparative Zoölogy Type No. 25875.

Type locality. El Yunque, Puerto Rico, circa 3000 ft., collected in May 1938 by P. J. Darlington.

Remarks. Only one specimen, a male lacking antennae, is at hand. It is not so large or with so many wartlike protuberances as *H. eugeniae*, the only other species from Puerto Rico having warts.

Hadropoda verrucosa spec. nov.

Plate 2, Fig. 8

About 4 mm. in length, covered with yellowish appressed pubescence with a few longer erectish dark hairs on the elytra, yellowish brown with the occiput, the last three antennal joints, and the sides of the prothorax a deeper brown, an indefinite reddish brown area across the middle of the elytra; surface of elytra somewhat irregularly costate.

Head with interocular space about half its width; occiput densely punctate and covered with closely appressed pubescence, top of head deeper brown. Antennae extending almost to the middle of the elytra, last three joints deeper brown. Prothorax about a fourth wider than long with the sides nearly straight, a slight incurving behind the middle; densely punctate and covered with closely appressed yellowish pubescence, the usual median and lateral depressions; deep reddish brown with the sides even deeper in color. Elytra with strongly marked basal callosities and along the first three interstices from the suture irregular costate or even warty elevations; the striate punctures on the side and at the apex shallow and somewhat indistinct; surface shining beneath the yellowish pubescence, a few longer erect dark hairs. Length 4.2 mm.; width 2 mm.

Type male, Museum of Comparative Zoölogy Type No. 25876.

Type locality. Vicinity of Valle Nuevo, Dominican Republic, cloudforest, circa 6000 ft., collected in August 1938 by P. J. Darlington.

Remarks. The warty interstitial elevations on the elytra, the indistinct striate punctures along the side, and the large size distinguish this from the other warty species.

Hadropoda turquinensis spec. nov.

Plate 3, Fig. 21

About 3 mm. in length, faintly shining under the short appressed pale pubescence, pale reddish brown with deeper brown markings across the middle of the elytra; last three joints of the antennae darker.

Head with interocular space about half its width; densely punctate over occiput and covered with short pubescence. Antennae not reaching the middle of the elytra, pale yellow except the last three joints, 5th joint longer than 3rd or 4th. Prothorax nearly a half wider than long with sides nearly straight; surface with only traces of lateral and median depressions, densely and shallowly punctate and covered with fine silvery pubescence. Elytra not greatly depressed in basal half with only a moderate basal callosity and without much trace of intrahumeral sulcus; surface shining through the fine light pubescence; a deeper reddish brown irregular band across the middle. Length 2.9 mm.; width 1.3 mm.

Type female, Museum of Comparative Zoölogy Type No. 25877.

Type locality. Pico Turquino (summit), 6000 ft. alt., Cuba, collected June 10–21, 1936 by P. J. Darlington.

Remarks. This species differs from the only other Cuban species so far collected, *H. ferruginea* Suffrian, in having a smaller head and prothorax, in being more convex, with fewer depressions on the prothorax and elytra, and having different elytral markings, and a fine light pubescence instead of the somewhat curling long pubescence of *ferruginea,* which in the latter gives the elytra a different shading in the light.

Hadropoda gracilenta spec. nov.

Plate 3, Fig. 20

Nearly 3 mm. in length, elytra faintly shining through the pale short pubescence; pale reddish brown with the tip of the last antennal joints dark, an interrupted median fascia and spot near the apex of the elytra deep brown; elytral punctures very distinct.

Head with interocular space a little over half its width, occiput densely but obsoletely punctured and rather sparsely pubescent, well rounded and broad. Antennae scarcely reaching the middle of the elytra, 4th and 5th joints about equal and longer than 3rd or succeeding ones, apex of last three joints deeper in color. Prothorax nearly a fourth wider than long with sides slightly incurved below the middle;

the usual median and lateral depressions somewhat shallow, surface densely punctate and covered with short yellow pubescence. Elytra with slight basal callosities and short intrahumeral sulcus; punctures unusually large and distinct, pubescence short and not very dense, a few longer hairs at apex; surface shining, pale, except for a brown median fascia not extending entirely across the elytra and a dark spot near the apex. Length 2.7 mm.; width 1.6 mm.

Type male, Museum of Comparative Zoölogy Type No. 25878.

Type locality. La Visite and vicinity, La Selle Range, Haiti, 5–7000 ft. alt., collected Sept. 16–23, 1934, by P. J. Darlington.

Remarks. The distinguishing characteristics of this species are its broad, nearly bald occiput, the lightly and rather sparsely pubescent elytra, and the large striate punctures.

Hadropoda minuta spec. nov.

Plate 3, Fig. 14

About 2 mm. in length, faintly shining beneath the dense, closely appressed, silvery pubescence, yellowish brown with slightly darker shadings in the middle of the elytra and near the apex; sides of the prothorax sometimes dark; the apical joint of the antennae dark.

Head with the interocular space about half its width, closely punctate over occiput and covered with pale pubescence. Antennae extending to the middle of the elytra with the fifth joint longer than the third or fourth or succeeding ones, the apical joint dark. Prothorax about a third wider than long with the sides nearly straight, the usual median and lateral depressions well marked, surface covered with dense pubescence, pale, one specimen with darker lateral edges. Elytra with basal and humeral prominences moderately prominent, and the striate punctures large and distinct; surface faintly shining beneath the dense pale pubescence; yellow brown with deeper shadings near the middle and towards the apex, these not very well marked in the two specimens examined; body beneath deeper reddish brown with the tip of the abdomen pale. Length 1.9–2 mm.; width 1 mm.

Type male and one paratype (female), Museum of Comparative Zoölogy Type No. 25879.

Type locality. Villa Altagracia, Dominican Republic, collected in July 1938 by P. J. Darlington.

Remarks. This is one of the smallest species and especially noteworthy because of its distinct, almost coarse, elytral striation.

Hadropoda robusta spec. nov.

Plate 4, Fig. 23

About 2.5 mm. in length, broadly oblong, shining, finely pubescent, pale yellow brown with a more or less well marked deeper brown median fascia interrupted widely at the middle and in one specimen an apical streak, the two last joints of the antennae dark.

Head with interocular space about half its width, densely and coarsely punctate over occiput and front, and with scanty pubescence. Antennae extending to the middle of the elytra, fourth and fifth joints slender and about equal in length and longer than third or succeeding ones, the last two dark. Prothorax nearly a half wider than long with the sides slightly constricted behind the middle, the surface with the median and lateral depressions shallow and not very distinct; densely punctate and with very fine short pubescence; entirely pale. Elytra with basal and humeral prominences well marked; surface shining, punctures clearly seen beneath the short light pubescence, a few longer suberect dark hairs; pale with an interrupted median fascia, sometimes not very distinct, and sometimes a dark streak near the apex. Body beneath darker on the sides. Length 2.2–2.9 mm.; width 1.3–1.5 mm.

Type male and 4 paratypes (female), Museum of Comparative Zoölogy Type No. 25880. 1 paratype (female) in National Museum, U. S. Nat. Mus. Cat. No. 56151.

Type locality. Constanza to Jarabacoa, Dominican Republic, 2–4000 ft. alt., collected in August 1938 by P. J. Darlington.

Remarks. The distinctive features of this species are its robust form, short and rather scanty pubescence, coarsely punctate head and scattered long suberect elytral hairs.

Hadropoda elachia spec. nov.

Plate 3, Fig. 19

About 2 mm. in length, faintly shining through the fine light pubescence, pale yellow brown with the apical antennal joint dark.

Head with interocular space half its width, densely punctate and covered with fine pubescence. Antennae extending to the middle of the elytra, fourth and fifth joints longer than third and subequal to the succeeding ones, pale yellow except the dark apical joint. Prothorax nearly a half wider than long, with sides about straight; surface covered with fine appressed pale pubescence, the usual lateral depressions well

marked. Elytra with humeral and basal callosities not very prominent, elytral striae well marked but the punctures not large; surface shining beneath the fine pale pubescence, yellow brown with faint traces of darker markings near the edge at about the middle and another spot before the apex, these markings not distinct in either specimen. Undersurface deeper reddish brown. Length 2.1–2.2 mm.; width 1 mm.

Type male and 1 paratype (female), Museum of Comparative Zoölogy Type No. 25881.

Type locality. Puerto Plata, Dominican Republic, collected Aug. 29–Sept. 2, 1938, by P. J. Darlington.

Remarks. This is about the size of *H. minuta* but differs in having less distinct elytral punctation and in not having so well marked basal callosities.

Hadropoda constanzae spec. nov.

Plate 3, Fig. 16

Between 2 and 3 mm. in length, faintly shining, covered with fine, closely appressed, pale pubescence, pale yellow with markings varying from reddish to deep brown and sometimes covering most of the basal half of the elytra, in these darker specimens the head and prothorax also dark; the last two or three antennal joints dark.

Head with interocular space half its width; densely punctate and with fine pubescence. Antennae extending to the middle of the elytra, the 4th and 5th joints longer than 3rd and subequal to the succeeding ones, the two and sometimes three apical joints dark, and in darker specimens the base of other joints darker. Prothorax about two-fifths wider than long, with sides nearly straight, lateral depressions on basal half well marked and densely punctate and covered with fine pubescence, in pale specimens the prothorax entirely pale but in heavily marked specimens almost entirely dark. Elytra broad with the humeral and basal callosities well marked and the striae unusually deep, producing a somewhat costate effect; faintly shining through the dense, closely appressed, pale pubescence; markings varying from deep reddish brown to piceous, unusually well marked, with basal callosities, an irregular median fascia and another near the apex, and sometimes nearly all the basal half dark. Body beneath dark brown with tip of abdomen and legs pale. Length 1.8–2.8 mm.; width 1–1.2 mm.

Type male and 3 paratypes (2 male, 1 female), Museum of Compara-

tive Zoölogy Type No. 25882. Two paratypes in National Museum, U. S. N. M. Cat. No. 56152.

Type locality. Constanza, Dominican Republic, 3–4000 ft. alt., collected in August 1938 by P. J. Darlington.

Other localities. Mt. Diego de Ocampo, 3–4000 ft., Dominican Republic, collected in July 1938 by P. J. Darlington.

Remarks. This is a broader, more robust species than *H. minuta* or *elachia*, although of the same small size, and it has unusually heavy markings on the elytra and deep striae.

Hadropoda morrisoni spec. nov.

Plate 3, Fig. 18

About 2 mm. in length, oblong oval, faintly shining under the fine, closely appressed, pale pubescence, pale yellow brown with the two apical joints of the antennae and a median elytral spot, rarely also an entire irregular fascia, dark brown; antennae usually not reaching much below humeri.

Head finely and densely punctate and covered with fine pubescence, entirely pale; interocular space half width of head. Antennae usually not extending to the middle of the elytra, the two apical joints stouter than the preceding ones, 5th joint a little longer than 3rd or 4th, last two joints dark. Prothorax nearly a half wider than long with the sides almost straight and the surface usually showing only faint traces of lateral and median depressions; finely punctate and covered with closely appressed pubescence. Elytra with well marked humeri and a short intrahumeral depression, but the usual basal callosities not so prominent as in many species of the group; the striate punctures distinct but not deep; surface faintly shining and covered with fine pale pubescence; pale yellow usually with an irregular deeper brown fascia, often interrupted, across the middle, this sometimes entirely missing. Undersurface frequently deeper brown in coloring than upper. Length 1.9–2.2 mm.; width 1 mm.

Type male and 10 paratypes (all female), U. S. N. M. Cat. No. 56153.

Type locality. Maricao, Puerto Rico, collected July 2, 1917 by H. Morrison.

Other localities. Maricao Forest, 2–3000 ft., collected May 30–June 2, 1938 by P. J. Darlington; Loiza, collected Feb. 27, 1933 by A. S. Mills; Adjuntas, on *Pomarrosa* (*Eugenia jambos*) fruit Jan. 13, 1933

by R. G. Oakley; Ponce, on Guava Dec. 30, 1933, by R. G. Oakley; Cidra, on *Palicourea crocea*, Aug. 5, 1932; San Juan, on leaf of *Pomarrosa* from Corazal, April 12, 1932, collected by Faxon and Anderson; Aguas Buenas, injuring rose-buds, Aug. 30, 1941, collected by Aguilar; all from Puerto Rico.

Remarks. The characteristics of this small pale species are its relatively short antennae with two thickened dark apical joints, and the absence of heavy elytral markings, the usual markings consisting of a small median and lateral spot, sometimes entirely absent and only rarely enlarged to form an irregular median fascia. The prothorax is not much depressed. The beetles have been sent to the Department of Agriculture as "doing lots of damage" to rosebuds. Apparently the species is abundant and something of a pest, as it has attracted the attention of fruit and flower growers by its depredations on a number of plants.

Hadropoda fennahi spec. nov.

Plate 3, Fig. 17

About 2 mm. in length, lightly pubescent, yellow brown with the last two or three antennal joints darker, the elytra with a darker brown lateral median spot and basal callosities and suture.

Head with interocular space half its width, densely punctate and pubescent over occiput, a shallow transverse depression above tubercles. Antennae scarcely reaching the middle of the elytra, the last two or three joints deeper brown. Prothorax between one-half and one-third wider than long, the sides nearly straight, slightly constricted near the base; surface covered with fine, short, closely appressed pubescence; the usual broad shallow depressions basally behind the anterior prominences. Elytra faintly shining under the short light pubescence; the striate punctures not coarse but distinct; the humeri well marked and a slight basal callosity on each elyron; these callosities deep brown, the darker color extending down the suture; at the middle and on the side extending half across each elytron a dark brown spot. Length 2–2.1 mm.; width 1 mm.

Type female and one paratype, also a female, U. S. N. M. Cat. No. 56285.

Type locality. Dominica, B. W. I., 800 ft. altitude, in forest, collected by R. G. Fennah.

Remarks. This species closely resembles the small pale Puerto Rico species, *H. morrisoni*, being about the same size and shape and with a

similar lateral dark spot on the elytra, but it is a more heavily marked, darker species and more lightly pubescent. The antennae are not so short and have the last two joints not thickened in the two females examined.

Hadropoda hoffmani spec. nov.

Plate 3, Fig. 22

Between 2 and 3 mm. in length, elongate oblong, covered with short, closely appressed pubescence, pale yellow or reddish brown, the apical joint of the antennae usually darker, elytra of darker specimens often shining with silvery patches of pubescence.

Head with interocular space half its width, densely punctate and pubescent. Antennae in male usually extending below the middle of the elytra, not so long in the female, 3, 4, and 5th joints subequal and long, last joint, sometimes last two, dark. Prothorax about a fifth wider than long, sides slightly contracted behind the middle, surface with two small median callosities and the usual lateral depressions; densely punctate and covered with thick pubescence. Elytra with moderately prominent humeri and basal callosities and distinct striate punctures, shining beneath the pubescence; the pubescence curling in various directions so as to produce by its shadings the appearance of silvery patches especially conspicuous on darker specimens. Body beneath usually reddish brown. Length 2–2.8 mm.; width .9–1.2 mm.

Type male and 14 paratypes, U. S. Nat. Mus. Cat. No. 56155. 2 paratypes (male and female) in Museum of Comparative Zoölogy.

Type locality. Rio Froide, Haiti, 1300 ft. alt., collected July 3, 1925 by W. A. Hoffman, on *Piper.*

Other localities. Croix Imbert, Haiti, Apr. 6, 1925 by W. A. Hoffman.

Remarks. The chief characteristics of this species are its narrow elongate shape, the curling pubescence that produces silvery patches on the elytra, and the somewhat spoonshaped aedeagus.

Hadropoda pallida spec. nov.

Plate 3, Fig. 15

About 2.5 mm. in length, finely and not densely pubescent, faintly shining, pale yellow brown with the sides of the prothorax sometimes darkened, and sometimes a median basal dark spot, the elytra with a dark spot on the basal callosities and sometimes at middle, the apical joint of the antennae dark.

Head with interocular space slightly more than half its width, densely but obsoletely punctate over occiput and front and glabrous. Antennae extending to the middle of the elytra, 4th and 5th joints longer than 3rd and succeeding ones, the apical joint dark. Prothorax about a third wider than long with sides a little contracted below the middle; surface densely and obsoletely punctured, faintly depressed on the sides, not conspicuously pubescent; the lateral edges tending to be dark and in two of the 3 specimens a dark median basal spot. Elytra with small, well marked humerus, short intrahumeral depression and a slight basal callosity; striate punctures small and vanishing before the apex, elytra with short and rather scanty pubescence; pale yellow with a small dark spot on the basal callosity and in some specimens a median spot on each elytron. Body beneath with upper part of abdomen usually deeper brown. Length 2.3–2.8 mm.; width 1–1.3 mm.

Type male and 1 paratype (female), Museum of Comparative Zoölogy Type No. 25883. 1 paratype (female) in National Museum, U. S. N. M. Cat. No. 56156.

Type locality. Loma Rucilla and mountains north, Dominican Republic, 5–8000 ft. alt., collected in June 1938 by P. J. Darlington.

Remarks. This species is distinguished by its pale coloring and by the scantily pubescent head, prothorax and elytra, the head being almost glabrous.

Hadropoda flavicoma spec. nov.

Plate 4, Fig. 28

About 3.5 mm. in length, yellow brown, densely covered with golden brown pubescence.

Head with interocular space a little over half its width, finely punctate and pubescent. Antennae extending to the middle of the elytra, 5th joint longer than 3rd or 4th, entirely pale. Prothorax a third wider than long with sides nearly straight; surface densely punctate and with the usual shallow basal and lateral depressions. Elytra with small, well marked humeri and basal callosities, and a transverse depression below them; densely covered with golden brown, closely appressed pubescence and a few longer suberect hairs; no dark markings, color uniformly golden brown. Undersurface and legs reddish brown. Length 3.6 mm.; width 1.6 mm.

Type male, Museum of Comparative Zoölogy Type No. 25884.

Type locality. Foothills of Cordillera Central, south of Santiago, Dominican Republic, collected in June 1938 by P. J. Darlington.

Remarks. The distinctive characters of this species are its large size, the entirely golden brown color of the body and its pubescence, which is dense but not curling as in *H. crispula*, from which it also differs in the shape of the aedeagus. Both species were taken in the same locality.

Hadropoda tabebuiae spec. nov.

Plate 4, Fig. 31

From 3 to 4 mm. in length, elongate, varying in color from yellowish brown to piceous, covered with golden pubescence, elytra usually with a more or less distinct median fascia, usually interrupted; prothorax without marked depressions.

Head with interocular space about half its width, depressed behind the tubercles and punctate, the punctation more or less hidden by pubescence. Antennae extending to the middle of the elytra, 3, 4, and 5th joints long; usually entirely pale, but in deeper colored specimens, sometimes deep brown or even piceous. Prothorax about a fourth wider than long, with sides nearly straight, surface densely punctate and unusually smooth, lacking the depressions usually so well marked in the other species; finely pubescent; varying in color from pale yellow to deep brown. Elytra with well marked intrahumeral depression and a transverse depression below the basal callosities; the interstices somewhat costate, particularly near the base; striate punctures large and deep, a dense golden pubescence covering all but not obscuring the punctures; color varying from pale yellow to deep piceous. Body beneath shining, varying in color from yellow to deep piceous. Length 2.9–4 mm.; width 1.3–1.6 mm.

Type male and 1 paratype (female), U. S. N. M. Cat. No. 56157. 1 paratype (female) in Museum of Comparative Zoölogy.

Type locality. Ponce, Puerto Rico, collected Sept. 6, 1934 on *Tabebuia* by R. G. Oakley.

Other localities. Adjuntas, Puerto Rico, March 1933, on *Inga laurina*, and also collected at Ponce, Puerto Rico, in March 1933, on coffee flowers by R. G. Oakley.

Remarks. This species is peculiar in having a prothorax in which the lateral and median depressions found in most species of the genus are nearly lacking. There is great variability in coloring even in a series taken from the same locality at the same time, some being nearly

piceous, while others are pale, some have a dark thorax and pale elytra, while others have a pale thorax and dark elytra. The dense golden pubescence is particularly noticeable in dark specimens.

Hadropoda dominicae spec. nov.

Plate 4, Fig. 27

About 3 mm. in length, pale yellow brown, with the tip of the antennae slightly darker, sometimes the edges of pronotum and a median streak dark, lightly covered with pale, appressed pubescence; the deep elytral striae nearly as wide as interstices.

Head with interocular space about half its width; densely punctate over occiput and front and densely pubescent. Antennae extending to the middle of the elytra, slightly longer in male, last joint, sometimes the last three joints, dark. Prothorax about a third wider than long, with sides nearly straight, surface somewhat depressed laterally, with slight median callosities; densely punctate and pubescent. Elytra with small prominent humeri and slightly elevated basal callosities; the striate punctures unusually deep and rather coarse, with elytral striae approximating in width the interstices; pubescence dense but short and not concealing the surface beneath. Body beneath shining brown, lightly pubescent. Length 2.7–3.3 mm.; width 1.1–1.3 mm.

Type male and 3 paratypes U. S. N. M. Cat. No. 56158. 1 paratype in Museum of Comparative Zoölogy.

Type locality. Greenhill Estate, 800 ft. alt., Dominica, British West Indies, collected July 3–12, 1941, by R. G. Fennah.

Other localities. One specimen, a female, collected also by R. G. Fennah, on the Saltoun Estate at 800 ft. alt., Dominica, British West Indies, June 30, 1941.

Remarks. The elytral striae are unusually well marked in this species. It resembles somewhat *H. hoffmani* of Haiti in its slender shape, but the elytral pubescence is not curling, and the aedeagus is quite different.

Hadropoda stenotrachela spec. nov.

Plate 4, Fig. 30

About 3 mm. in length, slender, antennae long, prothorax approximately as long as wide with very little trace of depressions; yellow brown, the last 4 or 5 antennal joints darker and a dark median streak on pronotum; covered with short pale pubescence.

Head with interocular space half its width; frontal tubercles clearly marked and a slight depression across vertex between the eyes; occiput and front covered with fine, short pubescence, lower part of face glabrous and impunctate. Antennae extending beyond the middle of the elytra, slender, not thickened, last 4 or 5 joints a little deeper in color. Prothorax unusually long, about as long as wide, sides slightly arcuate, narrowed near the base; surface with little trace of the usual depressions, covered with fine, short pubescence; yellow brown with a deeper brown median streak and dark edges. Elytra with fine, yet distinct striate punctation, the humeri marked by an intrahumeral depression; basal callosities well developed; surface shining, yellow brown, beneath the fine short pubescence. Body beneath and legs shining yellow brown, lightly pubescence. Length 2.6–3.3 mm.; width 1–1.3 mm.

Type male and 2 paratypes U. S. N. M. Cat. No. 56159, one paratype in the Museum of Comparative Zoölogy.

Type locality. Greenhill Estate, Dominica, British West Indies, 800 ft. altitude, July 3–12, 1941, collected by R. G. Fennah.

Remarks. This is unique among the species so far seen in that it has a prothorax approximately as long as wide, giving the beetle an unusually long, slender appearance.

Hadropoda hugonis spec. nov.

Plate 4, Fig. 25

About 3 mm. in length, robust, covered with dense golden pubescence with some longer more erectish hairs; head and pronotum dark brown or black, elytra brown with darker markings varying in size and shining with a greenish or purplish lustre, legs dark with paler bands, antennae dark with the 5th joint white, joints 6–11 becoming much enlarged.

Head with interocular space more than half its width, coarsely and densely punctate, almost rugose, and with thick pubescence, dark brown or black. Antennae not extending much below the humeri, even shorter in the female, dark with the 5th joint pale, the six outer joints much wider than the basal ones, 3rd longer than 4th or 5th joint. Prothorax about a half wider than long, a little wider than head, with a distinct tooth at anterior margin and a smaller nodule at basal angle, both seta-bearing; sides nearly straight, surface dark brown or black, sometimes along the base deep reddish brown; densely and very coarsely punctate with two small pronounced callosities near the

middle anteriorly; covered with yellowish pubescence. Elytra broad with pronounced humeri and basal callosities and a deep long intrahumeral sulcus curving inwards towards the suture; the elytral striae coarsely and deeply punctate; in color variable, some specimens pale yellow brown with darker metallic green or purple patches at base and along sides; in type specimen the elytra shining dark green with only a deep reddish brown stripe running down the middle, very shining under the dense and moderately long golden pubescence, some longer and erectish hairs. Body beneath shining and dark, the tip of the abdomen sometimes paler. Legs with pale bands, the anterior femora pale at base, the middle femora dark at base with a median pale band, the hind femora dark, tibiae in all banded; hind tibiae with sharp spur. Length 2.6–3 mm.; width 1.5–1.6 mm.

Type male Museum of Comparative Zoölogy Type No. 25885.

Type locality. Cloudforest, vicinity of Valle Nuevo, circa 6000 ft., Dominican Republic, collected in August 1938 by P. J. Darlington.

Other localities. Loma Vieja, south of Constanza, Dominican Republic, circa 6000 ft. alt., collected in August 1938 by P. J. Darlington.

Remarks. The broad, robust shape, together with the short, thickened antennae with the single white middle joint, the protuberances on the prothorax, and the metallic coloration of the elytra and their coarse punctation serve to distinguish this species. It is more nearly allied to the North American species included under *Hypolampsis pilosa* Ill. than it is to the West Indian species and may eventually be placed in a different genus together with *pilosa*. Unfortunately in the cleaning the type specimen lost most of its pubescence.

This species is named in memory of Hugo Inden who has always helped me in my entomological drawings and whose last hour of work was spent criticizing the drawings for this paper. Singularly appropriate is it also because at that time, only a few days before his death, when as an artist he was admiring this particular beetle, he remarked, "I hope you will sometime name a species for me."

Hadropoda barberi spec. nov.

Plate 4, Fig. 24

About 2 mm. in length, oval, with the elytra rounded and, as in wingless species, without humeral prominences; densely punctate and pubescent, yellowish brown with darker head and prothorax and dark base and fascia varying in width across the elytra; legs faintly banded,

antennae short, last 5 joints thickened, 5th and sometimes 6th joint white.

Head with interocular space about half its width, in male the head densely and very coarsely punctate and entirely dark except for the white mandibles; in one female the head not so densely punctate with the middle of the occiput smooth, and reddish with pale mouthparts; the tubercles well marked, with a little depression between; lightly pubescent. Antennae not extending much below humeri, 3, 4, 5, 6 joints slender, 5th, sometimes 6th white, apical five joints much thickened and dark. Prothorax about a third wider than long, with lateral sides very slightly rounded, a seta bearing tooth at each corner, surface very coarsely and densely punctate, with two sharp median elevations and a deep channel between, covered with moderately thick coarse golden pubescence. Scutellum pubescent. Elytra ovate, without humeral prominences, moderately convex, a strongly marked costa at 3rd interspace extending a third of the way down elytra; striate punctures coarse near the base and somewhat confused over part where humeri usually are; color deep reddish or piceous; in the male the basal third of elytra and lateral edge dark with traces of darker fascia, in both females the elytra deep brown with several irregular pale bands across elytra; these paler bands made conspicuous by the golden pubescence. Body beneath, the epipleura not extending to the apex; dark reddish brown, anterior legs pale except for slight trace of banding at base and apex of femora and tibiae, hind femora banded, tibiae pale, claws darker. Length 1.9 mm.; width 1–1.1 mm.

Type male and one paratype (female), U. S. N. M. Cat. No. 56160.

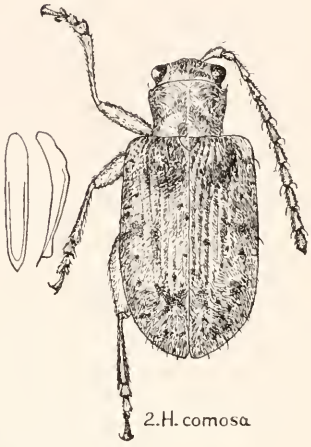
Type locality. Gov. Finca, Villalba, Puerto Rico, collected June 18, 1934 by R. G. Oakley.

Other localities. One specimen (female) on *Areca catechu*, Principi Finca, Adjuntas, Puerto Rico, collected Oct. 21, 1933 by R. G. Oakley.

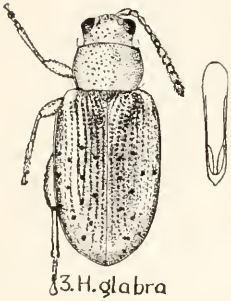
Remarks. This wingless species with its oval elytra appears quite unlike the other species. In its bicolored, apically much thickened antennae it resembles the Santo Domingan *H. hugonis* more than the rest. The aedeagus in this, however, is simple, whereas in *hugonis* there is a remarkable keel-shaped structure on the underside. Mr. H. S. Barber, for whom the species is named, had set it aside to describe as new.

PLATE 1

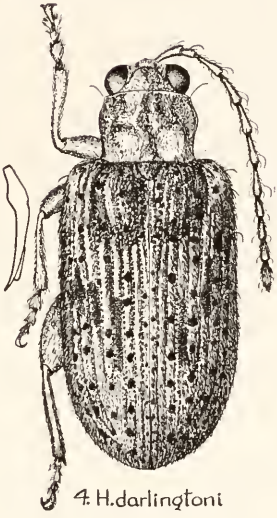
1. H. glabroguttata



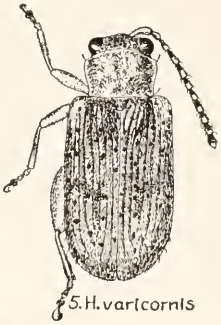
2. H. comosa



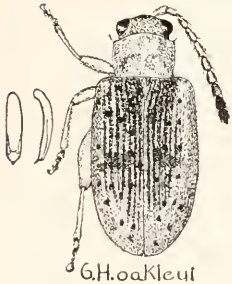
3. H. glabra



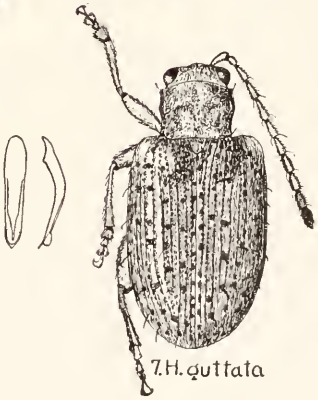
4. H. darlingtoni



5. H. varicornis



6. H. oakleyi



7. H. guttata

PLATE 2

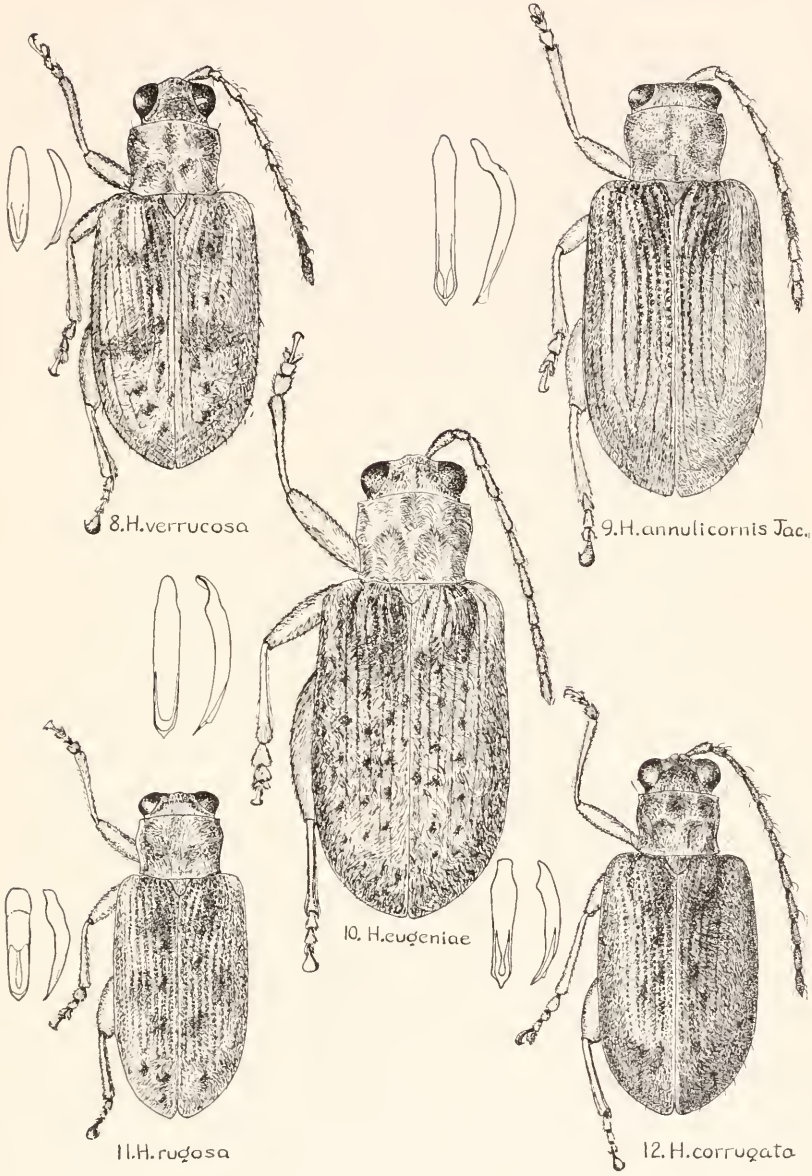

8. H. verrucosa
9. H. annulicornis Jac.
10. H. eugeniae
11. H. rugosa
12. H. corrugata

PLATE 3

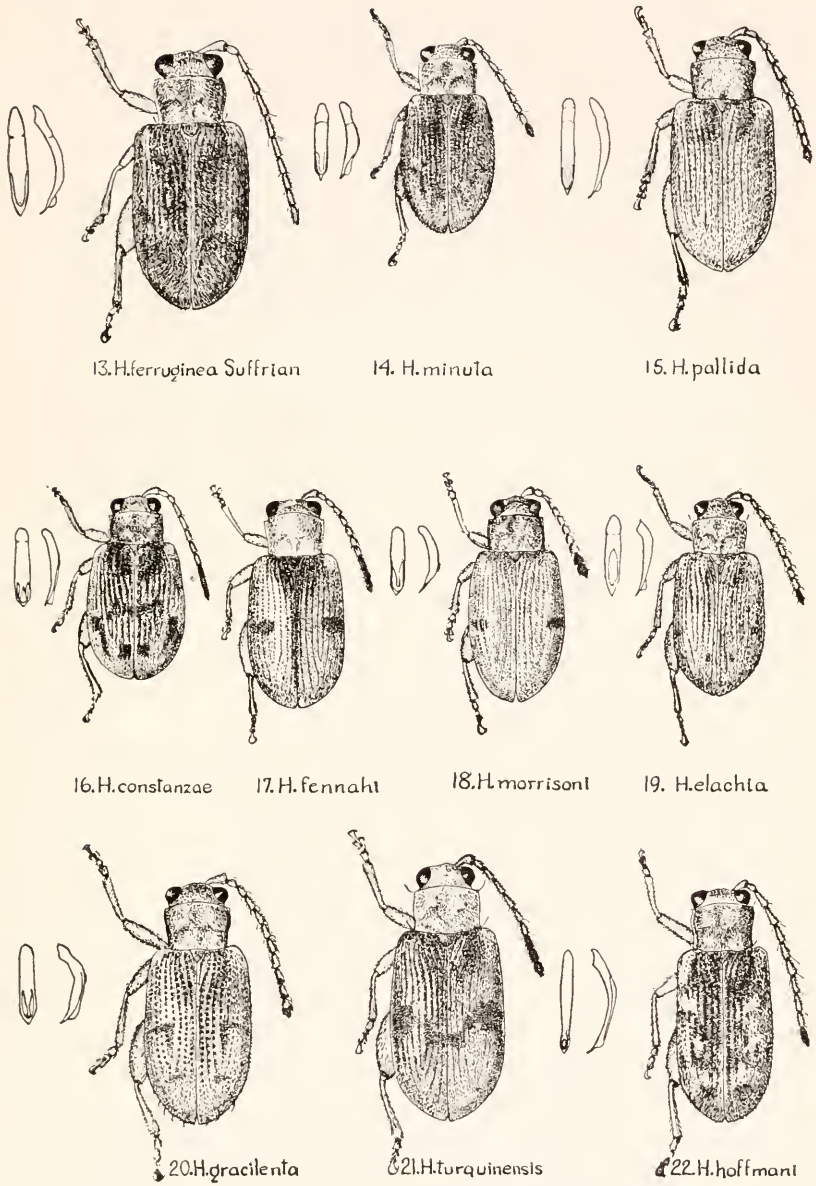
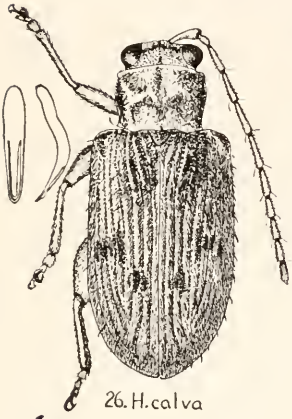

13. H. ferruginea Suffrian
14. H. minuta
15. H. pallida
16. H. constanzae
17. H. fennahi
18. H. morrisoni
19. H. elachta
20. H. gracilenta
21. H. turquinensis
22. H. hoffmani

PLATE 4

23. H. robusta

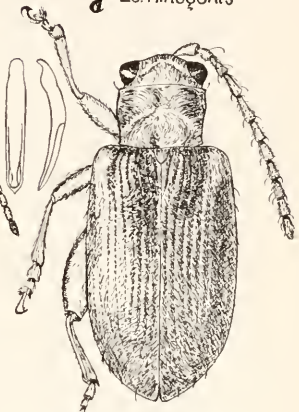
24. H. barberi

25. H. hugonis

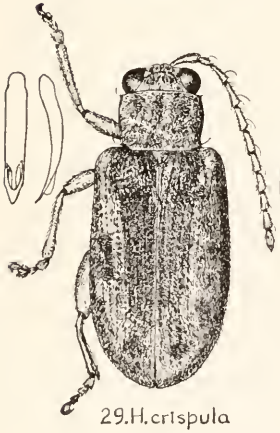


26. H. calva

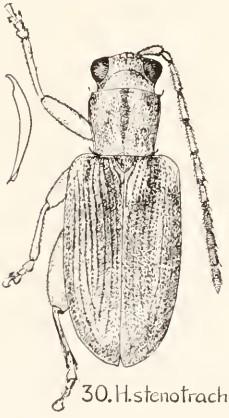
27. H. dominicae



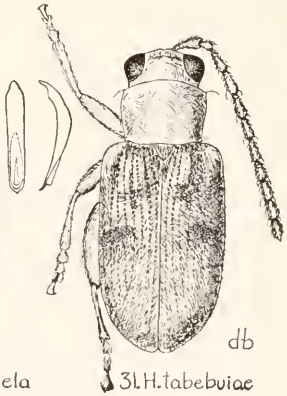
28. H. flavicoma



29. H. crispula



30. H. stenotrachela



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31. H. tabebuiae

MCZ-Bigelow

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THE SALTICID SPIDERS OF HISPANIOLA

BY ELIZABETH B. BRYANT

WITH EIGHT PLATES

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No. 9. — *The Salticid Spiders of Hispaniola*

By Elizabeth B. Bryant

Though Hispaniola is the second largest of the West Indian Islands, the study of its spider fauna has received slight attention. A few species attributed to "Haiti" and "San Domingo" were described by the older authors and in 1903, Dr. Nathan Banks published a short paper based on a collection made for him during the spring of 1899, by Mr. R. J. Crew, mostly in the vicinity of Port-au-Prince. In his paper, fourteen species of Salticidae were listed, three of which were new, *Cybele haytiensis, Icius separatus* and *Metacyrba pictipes;* these were included in the Collection of the Museum of Comparative Zoölogy.

As each island in the West Indies is studied, it becomes evident that a much larger number of species is endemic than was supposed by the earlier authors. In Cuba, of the 42 species of *Salticidae* seen by Bryant, 21 are only found on that island; in Puerto Rico, 12 species are endemic out of 16 species known from there; in the Virgin Islands, 5 species out of 10 found there are restricted to that group of islands.

Of the 44 known species of *Salticidae* from Hispaniola, 27 are new. The island has greatly varied ecological conditions, from low coastal plain, to mountain ranges, with high peaks that are often isolated by deserts, an effectual barrier to migration of many forms. Of the 17 *Salticidae* found elsewhere, two, *Plexippus paykulli* and *Marpissa bivittata* are cosmotropical, two are found in the southern part of the United States, six are found on other islands of the Caribbean, and seven have been described by earlier authors. Seemingly, the Salticid fauna shows a closer affiliation with the fauna of South America, than with that of Central or North America. The genera *Phidippus* and *Metaphidippus*, both so abundant in the number of species in North and Central America, are curiously wanting in Hispaniola. Only one species of each genus has been seen and these are both found on other islands. Five genera, *Descanso, Nebridia, Oningis, Siloca* and *Wallaba*, previously known only from South America, are represented by one or more species. The number of modifications of the mandibles, of the first pair of legs and of the opening of the posterior spiracle would suggest that this island has been isolated from the main land for a long time.

Schuchert, in the "Historical Geology of the Antillian-Caribbean Region", (1935), p. 39, says, "In the Greater Antilles, the relationship is closest between the flora of Haiti and that of Jamaica, 333 species being common to both." The same can be said about the spider fauna.

Two species are found only on these two islands, *Hentzia peckhami* (Cockerell) and *Metaphidippus prudens* (Peckham), and the two genera based on species in Jamaica, have corresponding species in Hispaniola. So far, not enough material is at hand, to draw useful conclusions about the fauna in the two parts of the island, Haiti and San Domingo.

The classification of the *Salticidae* is very unsatisfactory, and it has not been easy to incorporate the systems used by various workers. Simon, in the "Histoire Naturelle des Araignées," 1892–1903, for lack of better characters, used the number of teeth on the lower margin of the fang groove, dividing the family into three major sections. Unfortunately, neither the number or shape of these teeth are constant, even between male and female of a single species, thus, in some cases the male might fall in one group and the female in another.

The Peckhams used the number of teeth also, but they placed more weight on the relative width and length of the eye quadrangle. This is equally unsatisfactory. About the same time that Simon published his classification, F.O.P.-Cambridge wrote the section on *Salticidae* for the "Biologia Centrali-Americana: Arachnida;" vol. 2, (1900) and divided the family by the number and arrangement of ventral spines on the anterior legs. This has proved very satisfactory for the fauna limited to that restricted area, but it is not adapted for use in a wider field. The statement made by Cambridge holds equally true for Hispaniola; as he well said, "although the species assort themselves naturally into groups readily recognizable in a general way, yet when one endeavors to define their distinctive peculiarities, it becomes almost impossible to do so on account of intermediate forms."

In the Hispaniolan fauna, there are several modifications of the secondary characters of the male *Salticidae* that are unusual. Probably the most conspicuous is found in the genus *Dinattus*, where the cephalic portion is greatly widened by lateral triangular lobes, so that the width in the eye area is greater than the length of the cephalothorax. This is found in a much lesser degree in the genus *Agobardus* Keyserling, which has a small lobe below the second row of eyes.

The mandibles present many forms, small, vertical, large, divergent and porrect. For example, the genus *Pensacola*, first described from Guatemala, is differentiated by paired processes on the mandibles; however, species from Hispaniola, which have been attributed to this genus, differ in having these same processes multiple; other genera exhibit a spur or cusp on the exterior margin. Petrunkevitch noted this in a few Puerto Rican species, and both Bryant and Franganillo have

found it in several Cuban species; again, a long, sharp spur or tooth, quite distinct from the fang groove, is seen on the median margin of the mandible; this varies in size and sometimes projects at right angles, or may be in the same plane. This feature has been found also, in a few Cuban species; yet another variant takes the form of a hook on the exterior margin above the base of the fang; this is found in genera from other islands of the Caribbean, and curiously, the small vertical mandibles of one species of the little ant-like genus, *Descanso*, have a minute hook.

The ventral surface of the first femur may be strongly modified, both in form and color; it may be convex with a lateral carina, or may be iridescent or ornamented with fringes of hairs; the distal third is sometimes abruptly constricted and convex; the most remarkable modification perhaps, is in the number of ventral spines on the anterior metatarsi; in most *Salticid* genera, this is commonly two pairs. However, among the *Salticid* genera included by Cambridge in the Biol. Centr.-Amer., we find a single genus with three pairs, while in Hispaniola, four genera have been found with this modification, *Agobardus*, *Commoris*, *Dinattus* and *Wallaba*.

Other uncommon modifications have been observed. A strongly chitinized lobe over the opening of the posterior spiracle. This was first noted by O. P.-Cambridge, in a single species of the *Clubionidae* from Central America. It was noted by Bryant in the description of several Cuban species of *Agobardus* and is found in several genera from Hispaniola. In one species, *Siloca electa*, the chitinized opening extends across the full width of the abdomen. The second modification is of the labium, which has deep lateral pits on the basal half and depressed areas on the anterior portion of the sternum. This is found in the genus *Parahentzia*. Dr. Chickering has called attention to a similar modification in a species of *Parachemmis* (Clubionidae) from Panama.

The male palpi offer little variation. Most of the species have the embolus confined to the tip of the cavity in a simple spiral curve. The bulb may, or may not protrude onto the tibia and the relative length of tibia and patella varies with the genus.

The museum has material from Hispaniola that has been collected at various times. The earliest collection was made in 1873, by Dr. P. R. Uhler, and much of it was sent to Count von Keyserling, who had already described other material for the museum. Of the Uhler collection, only one *Salticid*, *Agobardus anormalis*, was named as new in 1883. This species, except for the types, was unknown, until recently found about Port-au-Prince.

In 1902, Dr. W. M. Mann collected in Haiti, and the *Salticidae* found by him were sent to the Peckhams for identification. Unhappily, Mr. Peckham died suddenly, and the collection had to be returned to the museum with only a few specific names added.

During 1934, a few spiders were incidently taken in Haiti, by Drs. Bates and Darlington and later in the same year, Dr. Darlington collected intensively about La Hotte. Four years later, he returned and collected in the less known central and eastern parts.

Since then, smaller collections have been received, which have added to our knowledge of the distribution of several of the more common species.

All the material used in this study is in the collection of the Museum of Comparative Zoölogy. I wish to express my sincerest appreciation to Mr. Banks for his unfailing interest and assistance, without which encouragement this work would have suffered.

Key to genera of male SALTICIDAE *recorded in this paper*

1. Eyes in four rows ..... *Lyssomanes*
   Eyes in three rows 2
2. Abdomen constricted at basal third, p.l.e. about middle of lateral margin ..... *Descanso*
   Abdomen not constructed 3
3. First tibia with 2 pairs of ventral bulbous hairs near base ..... *Parathiodina*
   First tibia with no ventral bulbous hairs 4
4. First metatarsus with 3 pairs of ventral spines 5
   First metatarsus with 2 pairs of ventral spines 8
5. Greatest width of carapace almost equal to length ..... *Dinattus*
   Carapace longer than wide 6
6. Carapace with a small lobe below second row of eyes, first femur modified by a carina or fringes ..... *Agobardus*
   Carapace without lobe below second row of eyes 7
7. Mandibles large and flat, with many hairs, a long median tooth, and a small hook at base of fang ..... *Commoris*
   Mandibles rather small, no hairs or scales and no processes ..... *Wallaba*
8. Carapace high, very broad, p.l.e. on extreme margin, all tibiae with dorsal basal spine ..... *Bythocrotus*
   Carapace not extremely wide 9
9. Sternum narrowed anteriorly to width of labium 10
   Sternum not narrowed to width of labium 11

10. First tibia with 3 pairs of ventral spines ..... *Menemerus*
First tibia with no ventral spines, or 1 small spine ..... *Metacyrba*

11. Mandibles long, porrect and cylindrical, inferior margin of groove with 3 or 4 teeth ..... *Amycus*
Mandibles not cylindrical 12

12. Ventral spines of first tibia confined to apical half, with inner row shorter than outer, 1 tooth on inferior margin of fang groove 13
Ventral spines of first tibia not confined to apical half 16

13. Mandibles porrect 14
Mandibles vertical 15

14. Carapace quite flat, first pair of legs only slightly enlarged ..... *Hentzia*
Carapace very broad, first pair of legs enlarged, labium with lateral pits. *Parahentzia*

15. First pair of legs fringed, quadrangle of eyes wider behind ..... *Phidippus*
First pair of legs not fringed, quadrangle of eyes as wide behind as in front ..... *Metaphidippus*

16. Mandibles long, porrect, with a long tooth on median margin .. *Antillatus*
Mandibles vertical 17

17. Front surface of mandibles with 2 or 3 median and lateral processes. *Pensacola*
Mandibles with fewer processes 18

18. Mandibles with a small hook over base of fang ..... *Compsodecta*
Mandibles without a hook over base of fang 19

19. Carapace high, with lateral lobe below second row of eyes, mandibles large and divergent ..... *Agobardus*
Mandibles relatively small and vertical 20

20. Third pair of legs heavily fringed 21
No heavy fringes on legs 22

21. Posterior pairs of legs with few spines, third tibia with a long median ventral spine ..... *Habronattus*
Posterior pairs of legs with many spines, heavy fringes on first three pairs of legs ..... *Corythalia*

22. First and fourth pairs of legs sub-equal; 3 pale stripes from ocular area to spinnerets ..... *Plexippus*
Fourth pair of legs longest, no continuous stripe from eyes to spinnerets . 23

23. Mandibles covered by a sheath, palpus short, about half as long as cephalothorax ..... *Siloca*
Mandibles normal, very small spiders 24

24. Legs, 4–3–1–2, anterior with lateral spines ..... *Nebridia*
Legs, 4–1–3–2, anterior with no lateral spines ..... *Oningis*

SALTICIDAE

Agobardus Keyserling 1884

Agobardus anormalis Keyserling

Figures 1, 2, 3, 4

Agobardus anormalis Keyserling, 1884, p. 519, pl. 13, fig. 21. "♂ ♀ Nord-Amerika" [probably Haiti]

Prosthesima perplexa Banks, 1903, p. 341, (*nec* Peckham 1901)

Male. Length, 4.7 mm., ceph. 2.5 mm. long, 2.1 mm. wide, abd. 2.4 mm. long, 1.0 mm. wide.

Colors much faded from age.

Cephalothorax very high, about one-fifth longer than wide, cephalic portion rounded with a lateral lobe beneath lateral eyes, with a crest of hairs from margin to near small eyes, highest between small eyes, a recurved depression between dorsal eyes from which starts the short thoracic groove, thoracic portion slopes gradually from groove for a short space and then falls abruptly, lateral margins almost vertical; *eyes*, anterior row strongly recurved so that upper margins of a.m.e. and lower margins of a.l.e. form a recurved line, many white hairs above eyes, a.m.e. separated by a line, a.l.e. less than a radius of a.m.e. and separated from them by a full radius of a.l.e., small eyes slightly nearer first than third row, dorsal eyes strongly convex, larger than a.l.e. and directed slightly backward, not on extreme margin of carapace; *quadrangle* of eyes as wide behind as in front; *clypeus* below a.m.e. almost wanting, a few white hairs below a.l.e.; *mandibles* vertical divergent from base, flat, narrowed at tip to width of fang, fang groove not sharply defined, oblique and long, superior margin with a compound tooth near median margin, with a few long hairs to base of fang, inferior margin with a compound tooth or plate with the cusp nearer base of fang longest and opposite tooth on upper margin, fang longer than groove, sinuous with distal half narrowed and tip bent, no tooth on lower side as Keyserling's figure shows; *labium* about as wide as long, sides almost parallel; *maxillae* twice as long as labium, tips widened but not extended in a lobe; *sternum* almost as wide as long, sides parallel, ending in a blunt point in front of IV coxae; *abdomen* oval, more than twice as long as wide, very much faded, but dark on sides, iridescent scales at base and lateral margins, venter faded but apparently dark from fold to spinnerets, no lobe over opening of spiracle, spinnerets closely grouped; *legs*, 1–4–3–2, all patellae with lateral

spines, I pair only slightly enlarged, femur flattened laterally with a strong ventral U-shaped carina with apex at the base and area between strongly covex and shining, a ventral fringe of short hairs on patella, tibia and metatarsus, spines, tibia, ventral, 2–2–2, middle pair longest, area between spines with a narrow brush of short iridescent hairs, prolateral, 3, not in line, retrolateral, 2, metatarsus, ventral, 2–2–2, basal pair very long, prolateral, 1, retrolateral, 1, tarsus two-thirds as long as metatarsus, II pair with spines the same as on I pair, III and IV pairs, tibiae with dorsal, basal spine, no apical whorl on metatarsi; *palpus* longer than cephalothorax, femur very slender, bent, with dorsal crest of white hairs near tip, patella and tibia flattened dorsally, with lateral fringes of iridescent hairs, seen from above, tibia twice as long as patella and twice as long as wide, tibial apophysis very inconspicuous and not as long as diameter of the joint, terminal joint not as long as tibia, cavity about two-thirds as long as joint, bulb not extending on tibia, embolus a small dark curved spine at tip.

Female. Length, 4.7 mm., ceph. 2.1 mm., abd. 2.6 mm.

Cephalothorax brown, with a median pale stripe from groove to posterior margin, sides parallel, no indication of lateral lobe as found in male, depression between dorsal eyes with a short thoracic groove, ocular area slightly rounded, thoracic portion in same plane as cephalic for a short distance and then falls rapidly to posterior margin; *eyes* same as in male but p.l.e. on extreme margin as there is no lateral lobe; *clypeus* less than a radius of a.m.e., a few white hairs below a.l.e.; *mandibles* pale brown, vertical, rather small, fang groove only slightly oblique, superior margin with two small contiguous teeth, inferior margin with a cusp that almost covers half the margin, end farthest from base of fang longer, fang about length of groove; *labium* and *mandibles* pale; *sternum* pale, convex, two-thirds as wide as long; *abdomen* with a few hairs and scales, a pair of dark basal spots connected at base, followed by a slightly smaller pair of dark spots, just posterior to middle a rather wide median pale stripe with scattered dark dots but only one distinct chevron, venter pale with a pair of widely separated dark stripes that are connected in front of spinnerets; *legs* 4–3–1–2, pale, with dark spines, spines same as in male; *epigynum*, a pair of dark sacs that touch on median margin above the fold, just anterior are two circular depressed areas, separated by a narrow septum, two dark dots that probably are the openings in lower portion of white areas that connect with the dark sacs.

Lectotype ♂ "U. S." [Haiti]

Allolectotype ♀ "U. S." [Haiti]

♂ Haiti; hills near Port-au-Prince, 2,000 feet, 2 October 1934, (Darlington)

♂ Haiti; Camp Perrin, 9 October 1934, (Darlington)

♂ ♀ Haiti; foot hills northeast of La Hotte, 3,000–4,000 feet, October 1934, (Darlington)

♂ ♀ Haiti; La Visite, 6,000–7,000 feet, 23 September 1934, (Darlington)

♂ ♀ Haiti; Port-au-Prince, (Crew), Banks Coll.

♀ Haiti; Peckham Coll.

The species *Agobardus anormalis* Keyserling has long been unique. At the end of the description, Keyserling states, "North America. In the Collection of the Museum of Comparative Zoölogy several specimens, with only the notation U. S." Since it never has been taken anywhere in the United States and it is common in Haiti, it is probable that these specimens were taken by Dr. Uhler in Haiti. Not much can be added to the Keyserling description. Probably because of poor illumination, he did not see the U-shaped carina on the ventral side of the first femur with the convex area between, and he evidently did not consider the number of spines on the anterior metatarsi as important,

From the number of specimens seen, the species is subject to some variation. Some specimens have no tooth on the ventral side of the fang and the lateral lobe below the eyes may vary in size, but all males have the same teeth on the fang groove and the palpi have the tibia flattened dorsally with lateral fringes of iridescent hairs. There is also some variation in size but all have the divergent mandibles with the same shaped teeth.

Agobardus anormalis montanus var. nov.

Figure 5

Male. Length, 5.0 mm.

Coloring, eyes and spines the same as in the type but the fang groove much more concave and the teeth on both margins larger; the tooth on the superior margin longer and the plate on the inferior margin larger with an extra tooth at the end nearer the base of the fang; the fang, in addition to the ventral tooth about the middle, found in the type, has a larger tooth very near the base with a small denticle on the distal side.

The palpus is the same in both the type and the variety, but the tibia of the variety is about two and a half times as long as wide, while in the type specimens, it is only twice as long as wide.

Holotype ♂ Haiti; foot hills northeast of La Hotte, 3,000–4,000 feet, October 1934, (Darlington)

Paratype ♂ Haiti; La Hotte, Roche Croix, 5,000 feet, 13 October 1934, (Darlington)

Paratype ♂ Dom. Rep.; foot hills of Cordillera Central, south of Santiago, 3,000 feet. June 1938, (Darlington)

Agobardus brevitarsus spec. nov.

Figures 6, 8, 11

Male. Length, 4.0 mm., ceph. 2.0 mm., abd. 2.1 mm.

Cephalothorax dark chestnut-brown, black about the eyes, scattered white scales on posterior margins, cephalothorax high, four-fifths as wide as long, widest between small eyes, where there is a small lobe or swelling just above the margin, with a vertical crest of short hairs, sides vertical, row of long bristles above anterior eye row, a shallow recurved depression posterior to dorsal eyes from which starts the short thoracic groove, thoracic portion slopes gradually and then falls rapidly on posterior quarter; *eyes*, anterior row recurved by upper margins, a.m.e. separated by little more than a line, a.l.e. less than a radius of a.m.e., and separated from them by a radius of a.l.e., small eyes midway between first and third rows, p.l.e. and a.l.e. subequal, p.l.e. convex and slightly raised; *quadrangle* as wide in front as behind; *clypeus* below a.m.e. narrow, less than a half a radius of a.m.e., no hairs or scales but a mass of white hairs below a.l.e.; *mandibles* reddish-brown, large, median margin touching for basal fifth, then widely divergent and excavate, fang groove long and oblique, superior margin with a large sharp tooth near the median edge, that can be seen in front view, inferior margin with a large bicuspid tooth nearer base of fang than tooth on opposite margin, cusp nearer fang longest, fang long and sinuate, distal half constricted; *labium* dark brown, with a rebordered tip, as long as wide; *maxillae* about twice as long as labium, tip only slightly dilate; *sternum* brown, convex, three-fifths as wide as long, narrowed between I coxae, IV coxae almost touching; *abdomen* oval, with a median pale stripe indented about the middle, and with five pale chevrons on posterior half, sides brown, with diagonal pale stripes of small dots, venter dark brown, openings of posterior spiracle inconspicuous, no iridescent scales on abdomen; *legs*, III and IV left missing, 1–4–3–2, all patellae with lateral spines, I pair dark brown, with pale tarsus, femur compressed prolateral surface glossy with no hairs, spines, tibia, ventral, 2–2–2, middle pair longest, prolateral, 3,

not in line, retrolateral, 2, metatarsus, ventral, 2–2–2, basal pair very long, prolateral, 1, retrolateral, 1, both very short and opposite distal pair, II pair, femur brown, other joints paler, femur compressed and prolateral surface same as on I pair, spines as in I pair, III and IV pairs paler, spines, tibiae with dorsal basal spine, III metatarsus with distal and median whorls, IV metatarsus with distal, median and basal whorls; *palpus*, not quite as long as cephalothorax, brown, femur curved with a ventral fringe and a dorsal crest of long white hairs, patella little longer wide, tibia little longer than patella with lateral fringes of white hairs, tibial apophysis almost as long as joint, cymbium as long as patella plus tibia, bulb confined to cavity, embolus at distal quarter in the usual spiral curve.

Female. Length, 4.5 mm., ceph. 2.3 mm., abd. 2.3 mm.

Cephalothorax brown, dark about eyes, a vague pale median stripe from thoracic groove to posterior margin, and a narrow pale stripe on posterior lateral margins, no white scales as on male, cephalothorax high, sides vertical, no swelling below small eyes, very faint depression posterior to dorsal eyes, thoracic portion slopes gradually from groove and then abruptly on posterior half, a row of long bristles above anterior eye row and below small and dorsal eyes; *eyes* same as in male; *clypeus* narrow, less than half a radius of a.m.e. below a.m.e. and covered with white scales; *mandibles* brown, vertical, fang groove horizontal and short, superior margin with one small tooth, inferior margin with a small bicuspid tooth, fang short; *labium* as in male; *maxillae* not dilated; *sternum* as in male; *abdomen* with a median pale stripe to middle, posterior half with five graduated chevrons, sides of alternate pale and dark lines, dorsum with scattered long bristles, venter with three dark stripes that meet in front of the spinnerets; *legs*, IV left missing, 1–4–3–2, I pair, femur pale, other femora with indistinct apical and basal dark rings, spines as in male; *epigynum*, two pale triangular areas, separated by a narrow chitinized septum, no openings can be seen.

Holotype ♂ Haiti; La Visite, 6,000–7,000 feet, 16–23 September 1934, (Darlington)

Allotype ♀ Haiti; La Visite, 6,000–7,000 feet, 16–23 September 1934, (Darlington)

Agobardus brevitarsus differs from the genotype, in smaller size, no carina on the first femur, the short tibia, and in the female, by the triangular pale areas above the fold.

AGOBARDUS OBSCURUS spec. nov.

Figure 7

Male. Length, 4.1 mm., ceph. 2.1 mm., abd. 2.1 mm.

Cephalothorax dark chestnut-brown, pale stripe from groove to posterior margin, in life probably covered with white scales as a few remain, scattered white scales on thoracic groove, cephalic portion high, eye area flat, recurved depression between dorsal eyes from which starts the short thoracic groove, lateral margins slightly curved but no lobe below lateral eyes, thoracic portion slopes gently from groove and the posterior half very abruptly, so that it is concave above the posterior margin; *eyes* cover about two-fifths of the cephalothorax, anterior row strongly recurved by upper margins, a.m.e. touching, with a cluster of long hairs between, separated from a.l.e. by little more than a line, a.l.e. about a radius of a.m.e., small eyes midway between first and third rows, p.l.e. convex, raised from carapace, on extreme margin, slightly larger than a.l.e.; *quadrangle* about as wide behind as in front; *clypeus* little more than a line below a.m.e., a few white hairs below a.l.e.; *mandibles* dark brown, divergent, convex, with a violet iridescence, a few white hairs about median margin, fang groove strongly oblique, margins poorly defined, a long stout tooth on superior margin at median edge, truncate at tip, with a small tooth on inner side, inferior margin with a large plate or cusp which covers about one half of the margin, with edge nearest fang extended in a long strong tooth, fang long and sinuous with tip curved; *labium* dark brown, as long as wide, lateral margins parallel, tip rounded and rebordered; *maxillae* dark brown, more than twice as long as labium, with tips slightly widened and upper outer corner rounded but not prolonged in a lobe; *sternum* dark brown, convex, almost round, IV coxae touching; *abdomen* oval, base and median area a dirty white, sides and posterior half dark, indications of five or six faint chevrons on posterior half, venter dark from pedicle to spinnerets, spinnerets on dorsal side pale with outer margins black, ventral side black; *legs*, III left missing, 4–1–3–2, brown with no dark rings, I pair heaviest, femur flattened laterally, ventral surface smooth and rounded, no carina, distal fourth slightly constricted with a few long dark hairs on retrolateral side, tibia and metatarsus with a violet iridescence, no hairs, spines, patella, lateral, 1–1, tibia, ventral, 2–2–2, with a violet iridescence between spines and a fringe of short hairs, prolateral, 2, retrolateral, 2, metatarsus, ventral, 2–2–2, basal pair half the length of the joint, prolateral, 1, very small at tip, tarsus pale and short, II pair, brown, spines, same

as on I pair, III and IV pairs, dark brown, spines, patellae, lateral, 1–1, tibiae with a small dorsal basal spine, and a ventral median spine; *palpus* shorter than cephalothorax, femur with basal half dark, curved, with a retrolateral crest of short black hairs, dorsal half covered with short white hairs, tibia one and a half times as long as patella, flat, with lateral brushes of long hairs which adds to width of the joint, tibial apophysis not as long as diameter of joint and divergent, terminal joint small, not as long as tibia, bulb confined to cavity, embolus a small spiral curve at tip.

Holotype ♂ Haiti; Swamp north of Dessalines, 11 August 1934, (Darlington)

It is with some hesitation that this species is placed in the genus *Agobardus* as the cephalothorax is not widened in the eye area, the a.m.e. and a.l.e. are much closer than in the genotype, the first femur is only slightly modified and the palpus is shorter than the cephalothorax. But it has the same type of mandibles and teeth, three pairs of spines beneath the anterior metatarsi with a very short prolateral spine at the tip, a median ventral spine on the third and fourth tibiae and a similar palpus.

Agobardus perpilosus spec. nov.

Figures 9, 10

Male. Length, 5.6 mm., ceph. 3.1 mm. long, 2.4 mm. wide, abd. 2.7 mm.

Cephalothorax dark brown, eye area with many white hairs, a broad lateral stripe of white hairs from dorsal eyes to posterior margin and a large spot of white hairs posterior to thoracic groove, moderately high, sides rounded from anterior margin, widest between dorsal eyes, a shallow depression posterior to dorsal eyes with a short thoracic groove; *eyes* cover about one-third of carapace, anterior row recurved by upper margins, a.m.e. separated by less than a radius of a.l.e. and about a radius of a.m.e. and separated from them by more than a radius of a.l.e., small eyes midway between first and third rows, dorsal eyes not on margin of carapace, convex and subequal to a.l.e.; *quadrangle* slightly narrower behind than in front; *clypeus* dark brown, narrow below a.m.e; and equal to a radius of a.m.e., with a fringe of dark hairs on margin; *mandibles*, yellow, with many short white hairs, large, divergent, median margin parallel for a short space, ending in a small, dark tooth on the superior margin of fang groove, fang groove long, oblique, margins indistinct except at base of fang, inferior margin

with a very large bicuspid tooth or plate, end nearer fang very long and curved, fang longer than groove, sinuous, distal third narrowed; *labium* dark brown, longer than wide; *maxillae* twice as long as labium, tips rounded, not prolonged in lobe; *sternum* brown, four-fifths as wide as long, convex, with a few long white hairs about margin, IV coxae touching; *abdomen* dark brown, with a median pale stripe, covered with white hairs, narrower at base than above spinnerets, posterior half with indistinct chevrons, venter infuscate, no lobe over opening of spiracle, spinnerets slender and closely grouped; *legs*, 1–3–2–4, brown, all joints covered with short white hairs and longer black ones, I pair slightly heavier, femur, with a ventral cross ridge or carina one-third above the base, area from carina to tip smooth with a thin retrolateral fringe of black hairs, spines, patella, prolateral, 1, tibia, ventral, 2–2–2, all shorter than diameter of joint, middle pair not opposite, prolateral, 2, retrolateral, 2, metatarsus, ventral, 2–2–2, all shorter than diameter of joint, prolateral, 1, opposite apical, retrolateral, 0, II pair, femur has ventral area smooth on distal half, but no carina, spines, patella, 1–1, tibia, ventral, 2 apical, 1r, 1r, metatarsus, ventral, 2–2–2, prolateral, 2, retrolateral, 1, opposite apical pair, III and IV pairs, patellae, lateral, 1–1, tibiae, short dorsal basal spine, metatarsi, apical and median whorls; *palpus* as long as cephalothorax, femur dark and bent, tip and patella covered with white hairs, tibia a little longer than patella, tibial apophysis small and inconspicuous, cymbium small, little longer than tibia, cavity about half the length, bulb not extending on tibia, embolus a small slender spiral curve at tip.

Holotype ♂ Dom. Rep.; Loma Rucilla, Pico del Yaque, 8,000–10,000 feet. June 1938, (Darlington)

Agobardus perpilosa has no lobe beneath the lateral eyes and the cephalothorax is not as high as in the genotype but is widened at the dorsal eyes, the fang groove is long with a large bi-cuspid tooth on the inferior margin, the fang is long and sinuous, and the first femur is slightly enlarged with a short ventral carina. The mandibles are more divergent than in most species.

Amycus C. Koch 1846

Amycus cambridgei spec. nov.

Figures 12, 13, 16, 17, 19

Male. Length, 5.1 mm., with mandibles, ceph. 2.5 mm. long, 2.0 mm. wide, abd. 2.6 mm., mand. 2.2 mm. long.

Cephalothorax chestnut-brown, darker about lateral and posterior margins, a short stripe of white scales on thoracic margins and a small patch of white hairs posterior to thoracic groove, cephalic portion very high, highest at groove from which it slopes forward to anterior row of eyes and backward more gradually to posterior margin, lateral margins only slightly rounded, thoracic groove short, about middle of carapace, from a very shallow, recurved depression between dorsal eyes; *eyes* cover about two-fifths of carapace, anterior row recurved by upper margins, a.m.e. large, separated by a line, a.l.e. less than a radius of a.m.e., and separated from them by less than a radius of a.l.e., small eyes nearer first than third row, dorsal eyes slightly larger than a.l.e. and very near margin of carapace; *quadrangle* slightly wider behind than in front; *clypeus* narrow, less than a quarter diameter of a.m.e., with no hairs or scales; *mandibles*, dark brown, long, no boss, porrect and cylindrical, median margin parallel for basal fifth where there is a long tooth or process which is parallel to the one on opposite mandible, segment is then bowed out and is almost parallel to opposite mandible, tip is about two-thirds as wide as base, fang groove very long and oblique, corrugate and margins of groove faintly indicated, superior margin with two contiguous teeth very near base, inferior margin with a large bicuspid tooth about middle, followed by three graduated teeth on right mandible and two on left, the large median tooth or process seen on the dorsal side, is not on the fang groove, fang very long, slightly sinuous and evenly tapering towards the tip; *labium* brown, slightly longer than wide, with a rebordered tip and small deep pits above the base; *maxillae* almost twice as long as labium, inclined, distal half widened so that greatest width equals length, outer margins rounded and slightly bilobed; *sternum* pale, anteriorly little wider than labium, two-thirds as wide as long, rounded in front of IV coxae, I coxae largest and separated by two diameters; *abdomen* oval, twice as long as wide, yellowish, with a pair of parallel faint gray stripes from base, these end in black spots posterior to middle, on posterior third a pair of more widely separated short dark stripes, venter pale, with a mass of dark hairs anterior to opening of the posterior spiracle, spinnerets closely grouped, anterior pair very slender; *legs*, 1–3–4–2, I pair much the longest and slightly darker than the others, II, III and IV pairs pale, I coxa very long, spines, all patellae with 1 prolateral and 1 retrolateral spine, I pair, tibia, ventral, 2–2–2, very slender, prolateral, 3, but not in line, retrolateral, 2, basal spine very small, metatarsus, ventral, 2–2, apical and submedian, prolateral, 2, retrolateral, 2, both opposite ventral spines, II pair, spines same as I pair,

III and IV pairs, tibiae with a minute dorsal basal spine, metatarsi, with three whorls of spines, but only the apical complete; *palpus* longer than cephalothorax, very slender, trochanter long, femur white, curved, patella plus tibia as long as femur, patella about two-thirds as long as femur, tibial apophysis slender, not as long as diameter of joint, terminal joint not as long as patella, slender, bulb does not extend on tibia, embolus a simple curved spiral at tip, as figured.

Female. Length, 6.5 mm., ceph. 2.7 mm. long, 2.0 mm. wide, abd. 4.0 mm.

Cephalothorax much darker than in male, not as high and longer in proportion, median pale stripe from groove that disappears before the posterior margin, a patch of white hairs anterior to groove and a lateral stripe of white as in the male; *eyes* same as in male; *clypeus* little more than a line below a.m.e., no hairs or scales; *mandibles*, dark brown, small, vertical, fang groove almost horizontal, short, superior margin with two contiguous teeth, inferior margin almost covered with a plate divided into four or five cusps, fang little longer than groove with a heavy base; *labium* longer than wide, with a chitinized point on middle of lateral margins that meets a chitinized ridge on maxillae; *maxillae* not twice as long as labium, tips rounded, not bilobed; *sternum* same as in male; *abdomen* with a pair of dark stripes on basal half, ending just beyond the middle, posterior half with four pairs of small dark dots with irregular dark spots on sides, venter pale with three dark stripes that meet above the opening of the posterior spiracle, but no mass of dark hairs as in male; *legs*, 1–3–4–2, II right missing and I right evidently recently renewed as much smaller than I left, I pair heavier, spines, anterior patellae, prolateral, 1, tibia, ventral, 2–2–2, heavier than in male, prolateral, 2, retrolateral, 1, metatarsus, ventral, 2–2, prolateral, 2, retrolateral, 2, II pair, tibia, ventral, 2–2–2, prolateral, 2, retrolateral, 1, metatarsus, ventral, 2–2, prolateral, 2, retrolateral, 2, posterior pairs, patellae, lateral, 1–1, tibiae with small basal dorsal spine, III metatarsus, distal whorl complete, median whorl incomplete, IV metatarsus both whorls complete; *epigynum*, area wider than long, two pairs of dark sacs beneath the skin, the larger above the fold, slightly separated with apparently large openings superimposed on sacs, these are connected with dark tubes leading to dark spots on the smaller sacs in anterior portion of the area.

Holotype ♂ Dom. Rep.; Cordillera Central, Constanza, 3,000–4,000 feet, August 1938, (Darlington)

Allotype ♀ Dom. Rep.; San José de las Matas, 1,500 feet, June 1938, (Darlington)

Paratypes 2 ♂ Dom. Rep.; San José de las Matas, 1,500 feet, June 1938, (Darlington)

The generic position of *Amycus cambridgei* is very uncertain. It probably belongs to a new genus as it does not agree with the definition of *Amycus* or *Cobanus* as given by either Simon or Cambridge. It agrees with the former genus in the number of teeth on the fang groove and the number of spines on the anterior legs but it differs in the width of the clypeus, and in the proportion of the joints of the palpus; it agrees with *Cobanus* in the low clypeus, but it disagrees with that genus in the number of spines on the anterior metatarsi. As far as known, no species of either genus has a median tooth on the mandibles.

Antillattus gen. nov.

Cephalothorax moderately high, nearly as wide as long, (6:7), widest opposite second coxae, sides rounded, ocular area flat, thoracic groove faint, in a depression between dorsal eyes; *eyes*, anterior row strongly recurved, small eyes midway between first and third rows, dorsal eyes larger than a.l.e. and not on extreme margin of carapace; *quadrangle* of eyes plainly narrower behind than in front; *clypeus* narrow; *mandibles* long, porrect, distal two-thirds divergent, superior margin of groove with two small teeth, inferior margin with a large plate divided into many teeth, fang long and sinuous; *maxillae* slightly dilate at upper margins; *sternum* not narrowed between anterior coxae; anterior coxae long; *legs*, 4–3–1–2, or 4–1–3–2, long and slender, I pair slightly enlarged, femur with dorsal row of spines, I tibia, ventral, 2–2–2, with prolateral and retrolateral spines, metatarsus, ventral, 2–2, prolateral, 2, distal spine very small, III and IV tibiae with very small dorsal basal spine; spinnerets long; *palpus* as long as cephalothorax, very slender, bulb confined to cavity.

Genotype *Antillattus gracilis* spec. nov.

Antillattus differs from *Agobardus* in the lower cephalothorax with no lateral lobe beneath lateral eyes, ocular quadrangle narrower behind than in front, p.l.e. not on extreme margin of carapace; mandibles long and porrect, anterior pairs of legs long and not modified by dense fringes.

Antillattus gracilis spec. nov.

Figures 14, 18, 20

Male. Length, 5.4 mm., without mandibles, ceph. 2.2 mm., abd. 2.6 mm., mand. 1.6 mm.

Cephalothorax pale brown, with two pairs of dark spots, first pair elongate from a.l.e. and including p.l.e., posterior pair smaller, on thoracic slope, two median patches of white scales, the anterior, between the dorsal eyes and the second between the posterior dark spots, a narrow marginal stripe of white scales starting abruptly above second coxae and ending above fourth coxae, anterior to marginal stripe, on margin, a narrow fringe of short black hairs above second coxae, carapace moderately high, widest at dorsal eyes, sides gently rounded, thoracic groove short, in a recurved depression between dorsal eyes; *eyes*, anterior row recurved, covering entire margin, with fringe of orange-red hairs above, a.m.e. separated by little more than a line, a.l.e. slightly more than a radius of a.m.e. and separated from them by about twice the space between a.m.e., small eyes slightly nearer first than third row, dorsal eyes not on extreme margin of carapace, strongly convex and larger than a.l.e.; *quadrangle* of eyes plainly narrower behind than in front; *clypeus* almost wanting below a.m.e., with no scales but a scant fringe of short hairs on the margin; *mandibles* pale, flat, with a violet iridescence, porrect, three-quarters as long as cephalothorax, median margin parallel for basal third, ending in a long, sharp tooth, distal two-thirds narrower, divergent and slightly excavate, distinct dorsal carina from tooth to base of fang, superior margin of fang groove with two small contiguous teeth at median margin, inferior margin with a much shorter carina and a large compound tooth near median margin, fang longer than groove, distal third constricted and bent; *labium* pale gray, longer than wide; *maxillae* almost twice as long as labium, tip widened, so that lobes can be seen from dorsal side of mandibles; *sternum* pale, slightly convex, almost as wide as long; *abdomen* very slender, pale yellow, with a pair of broken grayish stripes from base to about middle, these stripes on basal third have a rosy tinge due to small reddish scales, sides and distal half of dorsum with vague broken lines and spots of gray, no scales except on basal half, but many long dark bristles, the largest from distinct pits, venter pale with many short dark hairs in median area, ending with a distinct black spot at base of lobe that covers the opening of the spiracle, this lobe protrudes from the venter, spinnerets

long, white, with a long black line on lateral margins of superior and inferior pairs; *legs*, 4–3–1–2, long and slender, coxae, very long and can be seen beyond the carapace, I pair heaviest and darkest, no fringes, femur slightly enlarged, flattened laterally, reddish-brown, prolateral area smooth with a few hairs, ventral area smooth, with a few dark hairs in a short fringe on distal retrolateral side, other joints pale, with a few short dark hairs, spines, femur, distal, 3 small prolateral, followed by 1–1 dorsal, patella, prolateral, 1, tibia, ventral, 2–2–2, prolateral, 3, retrolateral, 1, metatarsus, ventral, 2–2, prolateral, 2, retrolateral, 2, the distal laterals very short, II pair smaller, pale, with short dark hairs, spines same as on I pair, III and IV pairs, white, spines black, femora with dorsal row of strong spines, patellae, lateral, 1–1, tibiae with a very small dorsal basal spine and a ventral submedian spine, metatarsi, distal and basal whorls; *palpus* longer than cephalothorax, very slender, femur curved, distal half covered with snow-white scales, tibia longer than patella, terminal joint little longer than tibia, with many coarse hairs, tibial apophysis a straight, slender spur, close to cymbium, not chitinized, bulb small, confined to cavity, embolus a spiral curve at tip.

Holotype ♂ Haiti; Dame-Marie, 1941, (Audant)

Antillattus gracilis is a very delicate and striking species, because of the long divergent mandibles with the dorsal side flattened and iridescent. The coxae, especially the first, are very long and extend beyong the carapace; the lobe over the opening of the posterior spiracle is more convex than usual. Several genera have the dorsal basal spine on the posterior tibiae very small and a few species have a median ventral spine on the third or fourth tibiae.

Antillattus placidus spec. nov.

Figure 15

Male. Length, 6.0 mm., ceph. 2.6. mm., abd. 2.7 mm., mand. 1.8 mm. long.

Cephalothorax dark chestnut-brown, a narrow marginal line of white hairs, a small spot of white hairs in depression between dorsal eyes and a small median spot of white hairs near posterior margin, cephalic portion rather high, eye area flat, sides slightly rounded, widest at dorsal eyes, a shallow semi-circular depression between dorsal eyes from which starts the thoracic groove, thoracic portion slopes gradually from groove and falls suddenly on the posterior half; *eyes*, anterior

row strongly recurved by upper margins, a few orange-red scales between a.m.e., eyes narrowly separated, a.l.e. about a radius of a.m.e., small eyes midway between first and third rows, p.l.e. larger than a.l.e., convex, not on extreme margin of carapace; *quadrangle* slightly narrower behind; *clypeus* wanting below a.m.e., a thick fringe of white hairs on margin; *mandibles* dark brown, long, porrect, slightly divergent, upper surface flattened and iridescent, tip only slightly narrower than base, a strong, sharp tooth on median margin at basal fifth, which may be on the superior margin of the groove, fang groove long and oblique, upper margin poorly defined with two small teeth near median margin, inferior margin with a cusp almost opposite small teeth on opposite margin, end of cusp near fang prolonged in a sharp point, fang longer than groove, sinuous and tip bent; *labium* brown, longer than wide, tip recurved and faint lateral pits near middle of margin; *maxillae* twice as long as labium, tips dilate; *sternum* brown, two-thirds as wide as long, anteriorly narrowed to width of labium, rounded in front of IV coxae; *abdomen* oval, more than twice as long as wide, pale, with a narrow median stripe of white hairs from base to spinnerets, each side on basal half brilliant orange-red scales, posterior half with irregular dark lines which form five pairs of dark spots on median pale stripe, venter dark gray from pedicle, ending in a thick mass of dark hairs, a large pale lobe over opening of posterior spiracle with free margin chitinized; *legs*, III right missing, 1–4–3–2, all coxae long and can be seen from dorsal side, all patellae with lateral spines, I pair much longer than others, all joints dark brown except tarsus, coxa very long, femur flattened laterally and ventrally but margins not compressed in a carina, a scant retrolateral fringe on distal half, a scant prolateral fringe on patella and tibia, spines, tibia, ventral, 2–2–2, prolateral, 3, not in line, retrolateral, 2, metatarsus, ventral, 2–2, apical and submedian, prolateral, 2, retrolateral, 2, II pair brown, femur not flattened, spines same as on first pair, III and IV pairs, pale, spines, tibiae, small dorsal basal spine, metatarsi, apical and submedian whorls; *palpus* as long as cephalothorax, femur bent almost at a right angle, dorsal half with a mass of white hairs, tibia longer than patella, both joints cylindrical with a prolateral and a retrolateral fringe of dark hairs, tibial apophysis slender and inconspicuous, almost as long as diameter of joint, cymbium slightly longer than tibia, covered with coarse dark hairs, bulb confined to cavity, embolus a spiral coil at tip.

Holotype ♂ Haiti; Ennery, 7 September 1934, (Darlington)

Paratype ♂ Haiti; Ennery, 7 September 1934, (Darlington)

Paratype ♂ Haiti; Miragoane, 2 November 1934, (Darlington)

Antillattus plaeidus differs from *A. gracilis* in much larger size, mandibles without a lateral carina, and the dark venter. The two paratypes from Ennery and Miragoane are much smaller than the type, the mandibles smaller and almost vertical, the long tooth on the median margin is much reduced in size but the area on the distal half is depressed as in the type. In several genera of the *Salticidae*, males have two forms of mandibles, the larger with long and porrect mandibles and the smaller form with small and vertical mandibles.

Bythocrotus Simon 1903

Bythocrotus cephalotes (Simon)

Figures 21, 24, 25

Mogrus cephalotes Simon, 1888, p. 204 "♀ pullus, San Domingo"
Bythocrotus cephalotes Simon, 1903, p. 673, figs. 793–795

Male. Length, 4.6 mm., ceph. 2.4 mm. long, 2.1 mm. wide, abd. 2.2 mm.

Cephalothorax brown, darker about eyes, a broad lateral stripe of white hairs from dorsal eyes to posterior margin, cephalic portion very high, broad and swollen, slightly depressed between dorsal eyes, short thoracic groove starts from a line drawn between dorsal eyes, highest posterior to dorsal eyes, where it slopes rapidly to posterior margin, so that the last of slope is almost vertical, posterior margin little more than half the anterior; *eyes*, anterior row recurved, a.m.e. separated by half a radius, a.l.e. about a radius of a.m.e., separated from them by fully a diameter of a.l.e., small eyes about midway between first and third rows, dorsal eyes on extreme margin of carapace, and raised on tubercles, subequal with a.l.e., a few long bristles between eyes of anterior row and more posterior to dorsal eyes; *quadrangle* wider behind than in front; *clypeus* equal to about a radius of a.m.e. and thickly covered with white hairs below a.m.e.; *mandibles* reddish-brown, vertical, rather small, front surface slightly convex and iridescent, fang groove short and horizontal, one large tooth on superior margin near median edge, with a fringe of black hairs to base of fang, inferior margin with one large tooth slightly nearer base of fang than is tooth on opposite margin, fang short with a very thick base; *labium* dark brown, longer than wide, with a pair of small pits just below middle on lateral margin; *maxillae* brown, not twice as long as labium, very slightly widened at tip; *sternum* brown, slightly convex, narrowed

to width of labium at anterior end, about twice as long as wide, but very small compared to size of carapace, pointed in front of IV coxae; a fringe of curved ciliae on retrolateral margin of IV coxae; *abdomen* oval, dark brown, no pattern, thickly covered with small, iridescent scales and long coarse dark hairs, venter brown, with no hairs and opening of posterior spiracle not conspicuous; *legs*, 1–3–4–2, IV right missing, brown, femora darker, anterior pairs with many small iridescent scales and a few hairs, all patellae with prolateral and retrolateral spines, all tibiae with a small dorsal basal spine, all ventral spines long and heavy, I pair, enlarged, patella and tibia flattened dorsally, spines, tibia, dorsal, 2–2, ventral, 2–2–2, prolateral, 1, retrolateral, 1, metatarsus, ventral, 2–2, basal pair almost as long as joint, prolateral, 2, retrolateral, 2, II pair, spines same as on I pair but smaller, III and IV pairs, metatarsi with distal and basal whorls; *palpus*, as long as cephalothorax, same color as legs, with very few hairs but many strong spines, femur rather short, patella longer than wide with a prolateral and retrolateral spine, tibia not as long as patella, slightly swollen, ventral side flat, with scattered hairs and a prolateral row of four stout spines on distal half, a prolateral process at tip in line with spines, tibial apophysis not as long as diameter of joint and heavier than dorsal process, cymbium small, as long as tibia, bulb does not extend on tibia, embolus a small spirial curve at tip.

Female. Length, 5.0 mm., ceph. 2.6 mm. long, 2.5 mm. wide, abd. 2.5 mm.

Cephalothorax and *eyes* same as in male; *clypeus* narrow, less than a radius of a.m.e.; mandibles vertical, brown, fang groove horizontal, two small contiguous teeth on superior margin, one very sharp tooth on inferior margin; *sternum* very narrow and small compared to size of carapace; *abdomen* oval, thickly covered with white and brown hairs in a vague pattern suggestive of *Zygoballus; legs* same as in male with the same spines; *epigynum*, an oval depressed area, white, wider than long, that shows little structure.

Allotype ♂ Haiti; Diquini, November 1912, (Mann), f. Peckham.

♂ ♀ Haiti; Port-au-Prince, (Crew), Banks Coll.

♀ Haiti; Port-au-Prince, July 1941, (Audant)

♀ juv. Haiti; Port-au-Prince, 2 October 1934, (Darlington)

Simon described the species from an immature female, larger than any specimen seen. The cephalothorax is unusually high and broad. The spines on the legs are interesting, as all patellae have a prolateral and a retrolateral spine and all tibiae have a dorsal basal spine in both male and female.

Commoris Simon 1902

Commoris modesta spec. nov.

Figures 22, 23

Male. Length, 4.6 mm., ceph. 2.1 mm. long, 1.7 mm. wide, abd. 2.6 mm.

Cephalothorax brown, eye area covered with short white hairs that continue in a converging stripe to posterior margin, a broad marginal stripe of white hairs from a.l.e. to posterior margin, many long bristles over anterior eye row, moderately high, ocular area flat, sides vertical and parallel, a shallow median depression between dorsal eyes, thoracic groove short and posterior to dorsal eyes, thoracic portion slightly lower than cephalic until the posterior quarter when it falls abruptly to margin; *eyes*, anterior row recurved by upper margins, a.m.e. separated by a line, a.l.e. less than a radius of a.m.e. and separated from them by a little more than a line, second row of eyes one third nearer first than third row, p.l.e. convex, slightly larger than a.l.e. and not on extreme margin of carapace; *quadrangle* narrower behind than in front; *clypeus* less than a radius of a.m.e. with no hairs or scales but a few long bristles on the margin; *mandibles* large, dark brown, thickly covered with short white hairs, vertical, flat, very broad and slightly divergent, outer margin with a slight carina, fang groove horizontal, long, with a long sharp tooth at median edge which extends from margin outward and slightly upward at a right angle to the groove, below this tooth are two small teeth on superior margin, inferior margin with a large plate that covers almost half the margin, end nearer base of fang longer, fang longer than groove and evenly curved; *labium* dark brown, about as long as wide, tip rebordered; *maxillae* fully twice as long as labium, tips slightly widened and outer margins rounded, not prolonged in a lobe; *sternum* dark brown, convex, two-thirds as wide as long, I coxae largest, separated by a little more than a diameter, IV coxae touching; *abdomen* oval, more than twice as long as wide, dorsum flat, dark brown, with many short white hairs and longer colorless hairs, posterior half with indistinct pale chevrons, venter paler than dorsum with short white hairs, openings of spiracle inconspicuous, spinnerets brown and closely grouped; *legs*, 4–1–3–2, not differing greatly in length, brown, with short white hairs and many dark hairs, I pair only slightly enlarged, femur flattened laterally, spines, patella, prolateral, 1, tibia, ventral, 2–2–2, middle pair not opposite and all spines less than diameter of the joint, prolateral, 3,

not in line, retrolateral, 2, a scant fringe of black hairs between ventral pairs, metatarsus, ventral, 2–2–2, lateral, 1–1, apical and very short, II pair, spines, patella, prolateral, 1, tibia, ventral, 2–2–2, prolateral, 2, retrolateral, 1, metatarsus, ventral, 2–2–2, basal pair very long, lateral, 1–1, apical and small, III and IV pairs, patellae, lateral, 1–1, tibiae with dorsal basal spine, III metatarsus, distal and median whorls, IV metatarsus, distal, median and basal whorls; *palpus* shorter than cephalothorax, femur and patella white and covered with white hairs, tibia and cymbium dark brown, seen from above, patella longer than tibia, tibial apophysis not quite as long as diameter of joint, with a thick base and a slender incurved hook at tip, bulb extends on tibia, embolus a spiral curve at tip.

Holotype ♂ Dom. Rep.; Cordillera Central, Valle Nuevo, southeast of Constanza, 7,000 feet, August 1938, (Darlington)

The genus *Commoris* was based on a male of a single species, *C. entoplognatha* from Guadeloupe. The description of the genus is very brief and is not expanded in the Histoire Naturelle des Araignées that appeared about the same time, (June 1903). It differs from *Coryphasia*, from Brazil, also described in the same paper, by two pairs of very unequal lateral spines on the anterior metatarsi, the apical pair are very short, the basal pair, long and resemble the ventral spines.

In this collection, there is no specimen of *C. entoplognatha* from Guadeloupe, but there is a specimen from Dominica, (Foote), which was identified by the Peckhams. This specimen agrees with the original description of Simon, except for the arrangement of lateral spines on the anterior metatarsi. There are three pairs of ventral spines, and a pair of very short distal lateral spines. It is not impossible, that Simon mistook the second pair of ventral spines as lateral, since he compares the length of the basal lateral spines with the ventral. Three pairs of ventral spines is a very uncommon character in the *Salticidae*.

Commoris modesta differs from *C. entoplognatha* in the slightly smaller size, darker color with many white hairs, but principally in that *C. modesta* has the outer margin of the mandibles not as strongly curved and the median tooth is longer and projects outward; there is no hook over the base of the fang.

Cybele albopalpis Peckham, described from a male from Jamaica, is congeneric with *Commoris modesta*. This species has three pairs of ventral spines on the anterior metatarsi, and a fissident tooth on the inferior margin of the fang groove.

Compsodecta Simon 1902

Compsodecta haytiensis (Banks)

Figures 26, 28, 32, 33

Cybele haytiensis Banks, 1903, p. 344, pl. 15, figs. 1, 9, 12. "Hayti ♂ ♀"
Eustiromastix haytiensis Petrunkevitch, 1911, p. 650.

Male. Length, 4.6 mm., ceph. 2.3 mm., abd. 2.3 mm.

Cephalothorax pale brown, black about the eyes, cephalic portion high, sides gently rounded, posterior margin about half that of the anterior, a few white hairs on sides and between eyes of anterior row, ocular area rounded, a recurved depression between posterior eyes, thoracic groove starts on a line between dorsal eyes, thoracic portion slopes gradually at first and then falls rapidly to posterior margin; *eyes* cover more than two-fifth of carapace, p.l.e. not on extreme margin, anterior row straight by upper margins, a.m.e. large, convex, separated by a little more than a line, a.l.e. about a radius of a.m.e. and separated from them by less than a radius of a.l.e., small eyes a little nearer a.l.e. than to p.l.e., dorsal eyes raised, convex and subequal to a.l.e.; *quadrangle* not as wide behind as in front; *clypeus* very narrow below a.m.e., less than one-half a radius of a.m.e., with a few scattered white capitate hairs; *mandibles* dark brown, large, vertical, flat, slightly divergent, both margins with a strong carina on basal half, the one on the inner margin turns abruptly about the middle and crosses to the exterior side, distal half of mandible slightly depressed, with a faint carina at distal end oblique to the groove, a small thickening near base of fang, which in large specimens is a hook, fang groove horizontal, superior margin with two continguous teeth, inferior margin with one strong tooth nearer base of fang than teeth on opposite margin, fang with a thick base and little longer than groove; *labium* pale brown, longer than wide, with a deep lateral pit each side, on basal half, as in *Parahentzia; maxillae* more than one and a half as long as labium, basal half of exterior margin deeply excavate, tips widened and lateral margins pointed; *sternum* pale, two-thirds as wide as long, narrowed to width of labium at anterior end and rounded posteriorly; *abdomen* oval, nearly half as wide as long, pale, with very faint marks on posterior half, venter dark; *legs*, 1–4–3–2, I pair heaviest, femur dark brown, flattened laterally, the flattened area iridescent, other joints pale, very few hairs, spines, patella, lateral, 1–1, tibia, ventral, 2–2–2, median pair not opposite, with a few dark hairs in area between spines, prolateral, 3, not in line, retrolateral, 3, not in line, metatarsus,

ventral, 2–2, basal pair more than half the length of the joint, lateral, 2–2, apical spines very short, II pair, pale, spines as on I pair, III and IV pairs, pale, spines, patellae, lateral, 1–1, tibiae with dorsal, basal spine, and a ventral median spine, metatarsi with distal and basal whorls and on IV metatarsus, 1 median spine; *palpus*, shorter than cephalothorax, light brown, tibia little longer than patella, both joints with a slight fringe of short dark hairs, tibial apophysis longer than diameter of joint, rather broad with an oblique tip which seen laterally is pointed, bulb does not extend beyond cavity, embolus a spiral curve at tip, ending beyond the cavity as figured.

Female, Length, 6.0 mm., ceph. 2.6 mm., abd. 3.2 mm.

Specimen has been dried and colors have disappeared.

Cephalothorax and *eyes* same as in male; *mandibles* pale brown, vertical, with no indications of carina found in male; margin of clypeus with a fringe of long hairs; *labium*, *maxillae* and *sternum* as in male; *abdomen* impossible to trace any color pattern; *legs* pale, spines as in male.

Types ♂ ♀ Haiti; Port-au-Prince, (Crew), Banks Coll.
3♂ Haiti; Port-au-Prince, (Crew), Peckham Coll.
♂ Haiti; Port-au-Prince, 2 October 1934, (Darlington)

Mr. Banks placed this species in the genus *Cybele* and compared it with *Cybele albopalpis* Peckham from Jamaica. Unfortunately, he knew this latter species only from the very brief description and the figures. The name *Cybele* is preoccupied (Low, 1845) in *Crustacea* so in 1902, Simon proposed *Compsodecta* for *grisea*, the second species from Jamaica described by the Peckhams, and *albopalpis* has been placed in the same genus. The two have little in common. *Compsodecta grisea* has a single tooth on the inferior margin of the fang groove, mandibles rather small, vertical, corrugate, with a distinct hook on the outer margin above the base of the fang, palpus with patella elongate, with a lateral carina and an apophysis at distal end; *albopalpis* also, has small mandibles that are vertical, but with no hook above the base of the fang and a fissident tooth on the lower margin of the fang groove and in the palpus, the patella is shorter than the tibia, and has no carina or apophysis.

In the type specimen of *C. haytiensis*, the hook above the base of the fang is not large and it was overlooked in the original description. In the larger specimen from Port-au-Prince, collected by Darlington in 1934, the hook is very distinct and in the smaller specimen, it can be traced as a swelling.

It can not be placed in the genus *Eustiromastix* as it has lateral

spines on the anterior metatarsi and the palpus has the tibia long, the embolus a short curve at the tip of the bulb, while in the genotype of *Eustiromastix*, the embolus is very long and encircles the bulb.

Compsodecta peckhami spec. nov.

Figures 29, 31, 35

Male. Length, 6.6 mm., ceph. 3.0 mm. log, 2.5 mm. wide, abd. 3.6 mm.

Cephalothorax pale brown, with lateral thoracic margin shaded with dark gray, cephalic portion very high, eye area flat with a recurved depression between dorsal eyes from which starts the very short thoracic groove, sides rounded, thoracic portion slopes gradually for first third and then abruptly to posterior margin, posterior margin about one half width of anterior; *eyes* cover two-fifths of carapace, lateral eyes heavily ringed with black, anterior row strongly recurved, with orange-red hairs above eyes, a.m.e. very large and touching, a.l.e. less than half the diameter of a.m.e. and separated from them by a radius of the latter, upper margins of a.m.e. and a.l.e. form a slightly recurved line, small eyes midway between first and third rows, dorsal eyes not on extreme margin, raised from carapace and subequal with a.l.e.; *quadrangle* as wide behind as in front; *clypeus* less than a radius of a.m.e. and without hairs or scales; *mandibles* dark brown, vertical, rather long, flat and corrugated, a small sharp tooth on outer margin above the base of the fang, projects downward, fang groove short, only slightly oblique, superior margin with two continguous teeth and a distinct carina to base of fang, inferior margin with one sharp pointed tooth, fang short with a heavy base; *labium* pale brown, longer than wide, with a rebordered tip; *maxillae* more than twice as long as labium, tip very much widened with a small tooth on outer upper corner, palpus inserted on basal half; *sternum* pale, slightly convex, two-thirds as wide as long, anteriorly truncate to width of labium and rounded in front of IV coxae; *abdomen* more than twice as long as wide, pale median stripe from base to spinnerets, in which are three or four dark chevrons on posterior third, sides gray of about the same width as the median stripe, venter with a broad dark median stripe from pedicel to spinnerets; *legs*, I left and III right missing, 1–4–3–2, I pair heaviest, with femur pale at base, gradually increasing in color until the metatarsus is dark brown, tarsus pale, spines, all patellae with prolateral and retrolateral spines, I tibia, ventral, 2–2–2, middle pair not opposite, prolateral, 3, not in line, retrolateral, 3, not in line, meta-

tarsus, ventral, 2–2, lateral, 2–2, II pair paler, spines same as on I pair but not as large, III and IV pairs, pale, tibiae with dorsal basal spine, IV metatarsus, with apical whorl of 5 spines and an interrupted basal whorl; *palpus* longer than cephalothorax, femur very slender with a retrolateral basal serrate carina and a crest of white hairs on distal half, patella more than half as long as femur, much wider, flattened dorsally, with a prolateral spur or tooth, near tip, as long as greatest diameter of joint, that extends forward and upward, a prolateral spine below base of spur, tibia not as long as patella, flattened on prolateral side with a crest of short black hairs, tibial apophysis not as long as diameter of the joint, terminal joint not as long as tibia, embolus a spiral curve at tip, bulb confined to cavity and relatively small.

Holotype ♂ Haiti; foot hills northeast of Massif de la Hotte, 3,000–4,000 feet, October 1934, (Bates).

Simon proposed this genus for two species described by the Peckhams from Jamaica as *Cybele*. It is not improbable, that the Peckhams sent specimens of *grisea* to Simon, for they had several, but *albopalpis* was described from a unique male, and Simon was familiar with it only from the figures and the very brief description. The two species belong to separate genera.

Compsodecta peckhami is very similar to *C. grisea*. The hook on the outer margin of the mandibles is small but the palpus is very characteristic. The patella is half as long as the femur, flattened dorsally, with a long process that extends onto the tibia. The tibia is shorter than the patella, flattened on the prolateral side, with a crest of short black hairs on distal half. The terminal joint is short and the palpal organ is small.

Corythalia C. Koch 1850

Corythalia elegantissima (Simon)

Figures 27, 30, 44

Dynamius elegantissima Simon, 1888, p. 205. "♀ San Domingo"

Male. Length, 5.5 mm., ceph. 2.5 mm. long, 2.0 mm. wide, abd. 2.5 mm.

Cephalothorax brown, darker about eyes, small white scales on lateral margins, between eye rows and in two parallel stripes from p.l.e. to posterior margins, carapace high, sides rounded, widest posterior to dorsal eyes, a recurved depression between dorsal eyes from which starts thoracic groove, thoracic portion on same plane as cephalic until very near posterior margin, when it falls abruptly; *eyes*, anterior

row recurved by upper margins, a.m.e. separated by little more than a line, a.l.e. about a radius of a.m.e. and separated from them by a radius of a.l.e., fringe of long bristles above anterior eye row, small eyes about midway between first and third rows, dorsal eyes not on extreme margin of carapace, slightly smaller than a.l.e.; *quadrangle* of eyes slightly narrower behind than in front; *clypeus* retreating, about equal to a radius of a.m.e., with no hairs or scales, but a group of long bristles between a.m.e.; *mandibles* dark brown, small, cone-shaped, fang groove very short, margins poorly defined, no teeth on either margin, fang short with a very heavy base; *labium* pale, longer than wide, tip narrower than base; *maxillae* pale, one and a half times as long as labium, tips only slightly widened; *sternum* brown, slightly convex, narrowed between I coxae, two-thirds as wide as long, IV coxae touching; *abdomen* oval, a basal band of brilliant orange-red scales and a narrow median stripe of white scales, each side is an elongate black spot of black scales broken on the sides by a diagonal pale stripe, venter with three vague brown stripes from fold to spinnerets, opening of posterior spiracle inconspicuous, spinnerets closely grouped; *legs*, 3–4–1–2, I left and III right missing, first three pairs heavily fringed with black hairs, I pair dark, almost black, femur with a scant prolateral and a retrolateral fringe on distal half, patella with a prolateral fringe, tibia and metatarsus with prolateral fringe and a thinner dorsal crest of shorter hairs on the same joints, dorsal side of patella and tibia strongly iridescent with a few iridescent scales, spines, patella, prolateral, 1, tibia, ventral, 2, apical, 1r, 1r, prolateral, 2, retrolateral, 2, metatarsus, ventral, 2–2, apical and submedian, prolateral, 2, retrolateral, 2, II pair, fringes and crests same as on I pair but heavier, spines same as on I pair but longer, III pair, with heaviest fringe, prolateral fringe on patella, tibia and metatarsus and a dorsal crest on tibia and metatarsus, spines, patella, lateral, 1–1, tibia, no dorsal basal spine, metatarsus, distal whorl complete, because of the heavy fringe, median and basal whorls can not be seen, IV pair with no fringe, spines, patella, lateral, 1–1, tibia, a dorsal basal spine fully twice the diameter of the joint, ventral, 2, apical, median, 1, dorsal, 2–2–2, metatarsus, distal and median whorls complete, basal whorl incomplete; tibia and metatarsus shorter than corresponding joints of III pair; *palpus* shorter than cephalothorax, pale, with coarse black hairs, patella slightly longer than wide, tibia less than half as long as patella, tibial apophysis slender and close to cymbium, terminal joint as long as femur, bulb extends slightly on tibia, embolus a long, slender black spine from a median depression at tip of bulb.

Female. Length, 6.0 mm., ceph. 3.0 mm. long, 2.1 mm. wide, abd. 3.1 mm.

Cephalothorax deep chestnut-brown, ocular area darker, scattered white scales on lateral margins, ocular area and thoracic slope, widest posterior to dorsal eyes, circular depression between dorsal eyes from which starts the short thoracic groove; *eyes* as in male; *clypeus* about the diameter of a.m.e., covered with short white scales; *mandibles* mahogany brown, vertical, cone-shaped, with a few dark hairs and white scales on median margin, fang groove short, no teeth on either margin but a scopula of black bristles on upper margin, fang short; *labium* pale, longer than wide; *maxillae* twice as long as labium, sides parallel, tips not widened; *sternum* brown; *abdomen* oval, a basal band of orange-red scales that disappears on the sides about the middle, and a narrow median stripe of white that almost reaches the tip of the abdomen, on each side are elongate black spots covered with black scales with a short diagonal lateral stripe of yellowish scales that does not reach the median stripe, venter dull yellow with three faint darker stripes; *legs*, 3–4–1–2, with no fringes, brown, with darker hairs and white scales, anterior pairs heavier, spines, I pair, patella, prolateral, 1, tibia, ventral, apical, 2, 1r, prolateral, 2, retrolateral, 2, metatarsus, ventral, 2–2, prolateral, 2, retrolateral, 1, I pair, patella, prolateral, 1, tibia, ventral, apical, 2, 1r, 1r, prolateral, 3, not in line, retrolateral, 0, metatarsus, ventral, 2–2, lateral, 2, posterior pairs, tibiae, dorsal, basal spine, III metatarsus, apical and median whorls, IV metatarsus, apical, medican whorls complete, basal whorl incomplete; *epigynum*, area wider than long, divided by a long slender septum, openings apparently at anterior end, each side of septum.

Allotype ♂ Haiti; Ouest, Kenskoff, 4,300 feet, (Roys)

♀ Haiti; Ouest, Kenskoff, 4,300 feet, (Roys)

♀ Haiti; Furcy, base of Mt. Bronette, 23 March 1940, (Folk)

♀ Haiti; Kenskoff, 2 September 1934, (Darlington)

♀ Haiti; Ennery, 30 September 1934, (Darlington)

♀ Haiti; foot hills, 3,000–4,000 feet, northeast Massif de la Hotte, October 1934, (Darlington)

The genus *Corythalia* was based by C. L. Koch on the species *latipes* from Brazil. It is a large heavy spider, with the leg formula 3–4–1–2, and the first three pairs of legs heavily fringed. The third and fourth tibiae have a long ventral median basal spine. This spine probably is not a generic character, as it is found in some species of *Habronattus* and in other species of *Corythalia*, such as *placidus*

Peckham, (*Dynamius*). In the genotype, the palpus is relatively short, with the patella longer than the tibia, the embolus forms almost a complete circle at the tip and the bulb extends beyond the cavity and rests on the tibia.

Unfortunately, many species have been placed in the genus that do not belong there. Some have no fringes on any legs, and some have the first leg longer than the third, and the palpi are of all possible types. The two species from Hispaniola that have been referred to the genus *Corythalia*, do not belong there in the strict sense, but it is thought best to leave them in that genus, until the Salticid genera of the West Indies are better understood.

Corythalia locuples (Simon)

Figures 37, 38, 43

Habrocestum locuples Simon, 1888, p. 203. "♀ San Domingo"
Prosthesima signata Banks, 1903, p. 341, (*nec signata* Banks 1901)
Prosthesima morgani Banks, 1903, p. 341, (*nec* Peckham 1909)

Male. Length, 5.5 mm., ceph. 3.0 mm. long, 2.1 mm. wide, abd. 2.4 mm.

Cephalothorax chestnut-brown, eye area much darker, scattered iridescent white scales posterior to first eye row, about small eyes and on flat thoracic portion, cephalic portion high, eye area flat, sides almost parallel, slightly wider posterior to dorsal eyes, a shallow recurved depression between dorsal eyes from which starts the well marked thoracic groove, thoracic portion level with eye area for almost half the distance, when it falls sharply to posterior margin; *eyes* cover a little more than one-third of carapace, anterior row recurved by upper margins, a.m.e. almost touching, separated from a.l.e. by less than a radius of latter, a.l.e. about a radius of a.m.e., a row of long bristles above anterior row of eyes, small eyes midway between first and third rows, dorsal eyes not on extreme margin of carapace, convex, and larger than a.l.e. and raised from carapace; *quadrangle* of eyes same width behind as in front; *clypeus* retreating, about as wide as diameter of a.m.e., with no hairs or scales but a group of bristles above and between a.m.e.; *mandibles* conical, with front surface flattened and covered with iridescent green scales, fang groove short, with margins indistinct, no teeth on either margin, fang short with a very heavy base; *labium* pale, longer than wide at base, with lateral margins on distal half much inclined; *maxillae* two-thirds longer than labium, upper margins rounded and widened but upper outer corner

not prolonged in a lobe; *sternum* pale brown, almost as wide as long, (3.0 : 3.5), anteriorly little wider than labium, ending in an obtuse point in front of IV coxae, all coxae same color as sternum; *abdomen* oval, fawn-color, thickly covered with iridescent scales, two pairs of large black spots in middle half, the color from black scales, spots separated by a narrow median stripe and a narrow cross bar of brilliant iridescent green scales, entire abdomen with scattered long black bristles, venter a dull brown, with no scales or long hairs, no lobe over opening of posterior spiracle; spinnerets long and closely grouped; *legs*, 3–4–1–2, not differing greatly in length, all coxae can be seen from above and covered with iridescent scales, I pair only slightly enlarged, dark brown with many long hairs and a prolateral fringe of black hairs on patella and tibia and a scanter retrolateral crest on the same joints, dorsal surface of patella and tibia a faint iridescent purple, spines, patella, prolateral, 1, tibia, dorsal, 0, ventral, 2–2–2, prolateral, 2, retrolateral, 2, lateral spines opposite ventral, metatarsus, ventral, 2–2, prolateral, 2, retrolateral, 2, II pair brown, patella and tibia flattened laterally with a purple iridescence, prolateral fringe of black hairs on patella and tibia and a retrolateral crest of short, clavate black hairs on same joints, both fringe and crest extend into metatarsus, spines same as on I pair, III pair, fringe on patella, tibia and metatarsus much heavier and hairs longer, dorsal crest on tibia and metatarsus of clavate hairs, spines, patella, prolateral, 1, retrolateral, 1, tibial and metatarsal spines hidden by fringe but apparently no dorsal basal spine on tibia, IV pair brown, with no fringe, spines scattered, patella, prolateral, 1, retrolateral, 1, a dorsal basal spine on tibia, an apical and median whorl on metatarsus; *palpus* shorter than cephalothorax, brown, patella twice as long as tibia, both joints thickly covered with white iridescent scales, terminal joint as long as tibia plus patella, covered with long coarse hairs, bulb extends on tibia, with tube very distinct, embolus a very short thick black spine at tip.

Female. Length, 6.5 mm., ceph. 3.0 mm. long, 2.0 mm. wide, abd. 3.5 mm.

Same as male except for the legs. *Legs*, 3–4–1–2, brown, not fringed, spines, I pair, patella, prolateral, 1, tibia, ventral, 2–2–2, prolateral, 1, retrolateral, 1, metatarsus, ventral, 2–2, prolateral, 2, retrolateral, 2, II pair, patella, prolateral, 1, tibia, ventral, 2, distal, 1r, 1r, prolateral, 1, metatarsus, ventral, 2–2, prolateral, 2, retrolateral, 2, III and IV pairs, patellae, lateral, 1–1, tibiae, dorsal basal spine, metatarsi, distal whorl complete, median and basal whorls incomplete; *epigynum*, a narrow median septum with small openings each side less

than their diameter above the fold, these open into tubes that are parallel to septum and enter the spermatheca near the anterior end, the position of the spermatheca evidently varies, as in some specimens they almost touch the fold and in others they are some distance above.

Allotype ♂ Haiti; swamp north of Dessalines, 11 August 1934, (Darlington)

♀ Haiti; Peckham Coll., (Banks)

♂ ♀ Haiti; Trou Caiman, 4 September 1934, (Bates)

♂ ♀ Haiti; Ennery, 10 September 1934, (Darlington)

♂ Haiti; Etang La Chaux, 27 October 1934, (Darlington)

♂ ♀ Haiti; Port-au-Prince, 4–5 September 1934, (Darlington)

♂ Haiti; Mt. Basil, 9 September 1934, (Darlington)

♂ Haiti; hills near Port-au-Prince, 2,000 feet, 12 October 1934, (Darlington)

♂ Haiti; Ouset, Kenskoff, 4,300 feet, (Roys)

♂ Dom. Rep.; San Lorenzo, Samana Bay, 26 April 1934, (Utowana Exped.)

Descanso Peckham 1892

Descanso formosus spec. nov.

Figures 34, 41, 53

Male. Length, 5.0 mm., ceph. 2.1 mm., abd. 2.6 mm.

Cephalothorax black about anterior portion and dorsal eyes and dark on posterior slopes, cephalic portion posterior to eyes a bright brown, many small white scales about eyes, cephalic portion covers over half the carapace, flat, with a slight depression behind dorsal eyes, then a distinct swelling, no thoracic groove, thoracic portion falls abruptly in a concave slope to posterior margin, anterior margin twice the width of posterior; *eyes*, anterior row recurved by upper margins, a.m.e. separated by a line, more than twice the diameter of a.l.e., a.l.e. separated from a.m.e. by a radius of a.l.e., small eyes minute, one-third nearer first than third row, dorsal eyes on extreme margin of carapace, raised, convex, larger than a.l.e. and directed backward; *quadrangle* narrower in front and as long as wide behind; *clypeus* brown, less than one-half radius of a.m.e., with a thin covering of white hairs and a fringe of long white hairs on the margin; *mandibles* dark brown, small, flat, with scattered white scales and a sharp carina on outer margin that ends in a small tooth above the base of the fang, fang groove slightly oblique, rather short, superior margin with two contiguous teeth on median edge, inferior margin with a broad bicuspid

tooth, fang short with a heavy base; *labium* dark brown, as wide as long, with a rebordered tip; *maxillae* dark brown, almost twice as long as labium, tips rounded and not dilate; *pedicel* chitinized, can be seen from dorsal side; *sternum* dark brown, slightly convex, smooth, triangular, fully twice as long as wide, between I coxae narrowed to less than width of labium, pointed in front of IV coxae, I coxae brown, enlarged, separated by less than half a diameter, II and III coxae pale, IV coxae brown and touching; *abdomen* oval, more than twice as long as wide, basal third constricted and covered with a brown scutum, followed by a narrow, transverse pale band at constriction, remainder of abdomen completely covered by a dark brown scutum, a vague dark gray shading in middle of cross pale band, sides white, with two pairs of gray spots, the smaller, anterior to cross band and the larger posterior to it, venter with a basal scutum to fold that is not connected with the dorsal scutum, a broad gray stripe from fold to spinnerets; *legs*, 4–1–2–3, I pair much enlarged, brown, hairs very small, femur laterally compressed with a distinct dorsal ridge, patella and tibia flattened dorsally, but not angulate, seen from above patella longer than tibia, tibia two-thirds as wide as long, metatarsus not as long as tibia, spines, no spines on patellae, no dorsal basal spine on tibiae, I pair, femur, dorsal, 2 small spines at tip, tibia, ventral, 2–2–2, middle retrolateral spine largest, basal retrolateral spine smallest, metatarsus, ventral, 2–2, distal and submedian, distal retrolateral largest, II pair slender, pale, prolateral dark stripe on patella, tibia and metatarsus, spines, femur, dorsal, 2, tibia, ventral, 1r–1r–1r, metatarsus, 1r–1r, III pair, pale, with a dark prolateral stripe on femur, patella, tibia and base of metatarsus, spines, femur, dorsal, 3 at tip, tibia, ventral, 1p at tip, retrolateral 1, metatarsus, ventral, 1r, at tip, 2 median but not opposite, IV pair, femur brown, other joints pale with a dark prolateral stripe on patella, tibia and metatarsus, spines, femur, dorsal, 3 at tip, middle, 1p. tibia, ventral, distal, 1p, basal, 1p, metatarsus, ventral, apex, 2, middle, 2; *palpus* about half as long as cephalothorax, pale, femur flattened laterally, with a sharp ventral carina, patella flattened dorsally, two-thirds as wide as long, tibia less than half as long as patella, with a few white scales, tibial apophysis dark, almost as long as joint, rather broad and heavy, cymbium longer than tibia plus patella, scattered white scales, bulb does not extend on tibia, embolus confined to distal third, forms almost a complete circle, ending in a straight point near tip of cymbium.

Female. Length, 4.5 mm., ceph. 1.6 mm., abd. 2.5 mm.

Cephalothorax, eyes and *clypeus* the same as in male, but fewer hairs

on clypeus and no fringe on margin; *mandibles* pale, small, weak, vertical, anterior surface convex, no carina or tooth on outer margin, fang groove short, superior margin with two contiguous teeth, followed by a scopula of coarse hairs to base of fang, inferior margin with a bicuspid tooth, fang with a heavy base; *labium*, *maxillae* and *sternum* same as in male; I coxae pale and not as large as in male; *abdomen* oval, not constricted, no scutum, the pale transverse band found in the male reduced to a pair of widely separated spots and the vague shaded area of the male is a large dark brown triangle with the apex directed forward, posterior third a dark brown, anterior muscle spots a pair of brown dots, the lateral stripes of the male are reduced to a pair of diagonal pale spots, venter gray with a large dark brown spot on posterior quarter; *legs*, 4–1–2–3, I pair pale brown, not as much enlarged as in the male, same arrangement of spines, but each spine much larger and from a raised base, II pair pale, with a broad dark stripe, spines, tibia, ventral, 1r–1r, III and IV pairs, pale with a prolateral stripe on femora, patellae, tibiae and metatarsi, no spines; *palps* short, terminal joint enlarged, tibia and last joints white, so that palps are conspicuous; *epigynum* rather large for the size of the spider, two broad transverse ovals, with heavily chitinized margins, separated by a narrow septum, middle of ovals white and depressed, openings apparently at ends of tubes that project into white areas from the posterior margins.

Holotype ♂ Haiti; Trou Caiman, 4 September 1934, (Darlington)

Allotype ♀ Haiti; La Visite, 6,000–7,000 feet, 16–23 September 1934, (Darlington)

Paratype ♀ Dom. Rep.; Loma Viega, Cordillera Central, south of Constanza, 6,000 feet, August 1938, (Darlington)

Paratype ♀ Dom. Rep.; Altagracia, July 1938, (Darlington)

The genus *Descanso* was based by the Peckhams in 1892, on two species, both known only from females, *Descanso vagus* from Santarem, and *Descanso chapada* from Chapada, Brazil. The descriptions are rather brief and no mention is made of the dentition of either species. The type of the genus was not designated until Simon redescribed it in the Histoire Naturelle des Araignées, 1901, 2, p. 533 and selected the first species as the type. The types of both species are in the Museum of Comparative Zoölogy Collection. *Descanso vagus* is in very poor condition. Most of the legs are missing as well as the mandibles and it is evidently more than one moult from maturity. There is a distinct depression of the carapace posterior to the dorsal eyes, which Mr. Emerton did not show in the figure. In the original description,

Peckham notes the deep notch on the lateral margin just posterior to the eyes. This is very conspicuous. The first leg, which is greatly enlarged, has the patella and tibia of equal length, both flattened on the dorsal side, but with no carina. The abdomen shows a slight depression at the basal third but there is no indication of a scutum.

In 1890, Simon described the genus *Consingis* for a male found near Rio, Brazil. It is not impossible that this genus is a synonym of *Descanso*, as it is described with a fissident tooth on the lower margin of the fang groove. The quadrangle of eyes is wider behind, the cephalic portion is carried beyond the dorsal eyes, the thoracic portion slopes abruptly to the posterior margin, the first pair of legs are enlarged with femur compressed laterally, patella and tibia of equal length and both flattened on the dorsal side and the fourth pair of legs spineless.

The male and female of *Descanso formosus* were not found together, but the markings, the enlargement of the first leg, with the same number of spines, the few spines on the posterior pairs, and the depression of the cephalothorax posterior to the dorsal eyes are the same in both. The male is larger than the female, but that is not uncommon among ant-like spiders. It probably has a wide distribution on Hispaniola, as females have been found in three localities.

It is not impossible that the genus *Peckhamia* Simon, 1901, based on *scorpionea* Hentz, will prove to be a synonym of *Descanso*, also.

Descanso magnus spec. nov.

Figure 36

Female. Length, 5.0 mm., ceph. 2.2 mm., abd. 3.0 mm.

Cephalothorax dark brown, black between first and second eye rows, with scattered small white scales, almost twice as long as wide, sides nearly parallel, cephalic portion covers four-fifths of carapace, eye area flat, with a deep transverse depression posterior to dorsal eyes, followed by a swollen area, no thoracic groove, thoracic portion falls abruptly to posterior margin in a concave slope; *eyes* cover about half the carapace, area as long as wide behind, anterior row of eyes recurved, a.m.e. more than twice the diameter of a.l.e., a.m.e. separated by a line, and from a.l.e. by a little more, second row of eyes one-third nearer first than third row, dorsal eyes on extreme margin of carapace, each raised and larger than a.l.e.; *quadrangle* slightly wider behind than in front; *clypeus* equals a radius of a.m.e., strongly retreating, with projecting white hairs, not scales; *mandibles* dark brown, small,

cone-shaped, flat, fang groove short, with a small bicuspid tooth on inferior margin, fang short, from a heavy base; *palpi* dark, terminal joint enlarged, patella and tibia flattened dorsally, patella as long as tibia; *labium* dark, as long as wide, with a rebordered white tip; *sternum* dark, triangular, two-thirds as wide as long, flat, narrowed between I coxae to width of labium and pointed in front of IV coxae; *pedicel* short and can not be seen from above; *abdomen* twice as long as wide, basal third constricted, strongly convex, covered with a dark scutum, sparsely clothed with white scales, remaining two-thirds wider, with dorsum flattened, a wide median dark stripe and slightly narrower white lateral stripes each side, entire abdomen with short colorless hairs, venter dark, with basal ends of lateral stripes curved on basal half, spinnerets small and inconspicuous; *legs*, 4–1–2–3, dark brown, with I and II metatarsi white, II tibia pale, III tarsus white, IV trochanter and patella white, I pair enlarged, femur flattened laterally, no spines, patella as long as tibia, both joints flattened dorsally, but with no carina on either margin, spines, tibia, ventral, 2–2–2, strong but not equal to diameter of the joint, each from a raised base, metatarsus, ventral, 2–2, long and heavy, distal and submedian, II pair, slender, no spines on femur or patella, tibia, ventral, 2–2, long and slender, basal and median, metatarsus, ventral, 2–2, slender and weak, no spines on posterior pairs; *epigynum*, two transverse ovals, separated by a narrow chitinized septum, lateral margins heavily chitinized, no structure can be seen.

Holotype ♀ Dom. Rep.; Jarabacoa, 2 August 1938, (Darlington), found with ants having similar abdominal marks.

Descanso montanus spec. nov.

Figure 40

Male. Length, 3.7 mm., ceph. 1.6 mm., abd. 2.0 mm.

Cephalothorax dark brown with scattering long white hairs, sides almost parallel, moderately high, a slight depression posterior to dorsal eyes, followed by a convex area, posterior margin rolled back and about half as wide as the anterior margin, no thoracic groove, thoracic slope not concave; *eyes*, cover almost half the carapace, anterior row of eyes recurved, so that a line drawn from upper margins of a.m.e. would pass through the middle of a.l.e., a.m.e. touching, a.l.e. separated from a.m.e. by a line and less than a radius of a.m.e., small eyes nearer first than third row, eyes flat and only slightly smaller than a.l.e., dorsal eyes on extreme margin of carapace, convex, larger than a.l.e.;

quadrangle of eyes slightly wider behind than in front, and as long as wide; *clypeus* retreating and below a.m.e. less than a radius of a.m.e., with a few white hairs; *mandibles* brown, vertical, weak, fang groove short, horizontal, superior margin with two contiguous teeth, inferior margin with one large bicuspid tooth, fang longer than groove; *labium*, brown, tip rebordered, about as long as wide; *maxillae* more than twice as long as labium, slightly divergent, brown, with median third pale; *sternum* brown, narrowed to width of labium between I coxae, convex, shining, pointed in front of IV coxae, which are narrowly separated, coxae pale, I coxae much the largest; *pedicel* dark brown, chitinized and can be seen between cephalothorax and abdomen; *abdomen* brown, with scattered white hairs, basal third narrowed and constricted, distal two-thirds swollen and larger, venter brown, with a basal scutum ending at fold, spinnerets small and closely grouped; *legs*, 4–3–1–2, I pair enlarged, femur brown, laterally compressed, patella and tibia flattened dorsally but with no carina, patella little shorter than tibia, spines, femur, dorsal, 2 small spines near tip, patella, 0, tibia ventral 2–2–2, all less than diameter of joint and from a raised base, metatarsus, ventral, 2–2, II pair pale, with a prolateral dark line on femur, patella and tibia, metatarsus dark, spines very small, femur, 2 distal, tibia, ventral, 2 distal, 1r–1r, metatarsus, ventral, 2 distal, 1 subbasal, posterior pairs pale and almost spineless; *palpus* shorter than cephalothorax, femur brown, patella pale, flattened dorsally, more than twice as long as tibia, tibial apophysis broad with an incurved tip that rests against cymbium, embolus confined to distal third, forms almost a complete circle, with tip thickened and twisted, very similar to *Peckhamia varicgata* (F. Cambr.)

Holotype ♂ Dom. Rep.; Cordillera Central, Constanza to Jarabacoa 2,000–4,000 feet, August 1938, (Darlington)

Descanso montanus is smaller than *D. formosus* and has the thoracic slope much longer and not concave. The cephalothorax is not widened posterior to the dorsal eyes. Both species have the first pair of legs greatly enlarged, with the tibial spines from a raised base. The abdomen is constricted at basal third and the palpus is of the same type, with the tibia shorter than the patella.

Dinattus gen. nov.

Cephalothorax high, (in male with a triangular lobe below lateral eyes, so that the greatest width is more than length), a deep recurved transverse depression between dorsal eyes, thoracic groove short;

eye area covers less than two-fifths of carapace, anterior row recurved by upper margins, eyes equidistant, small eyes nearer first than third row, p.l.e. elevated; *quadrangle* same width in front as behind; *clypeus* almost wanting below a.m.e., with no hairs or scales, three long bristles below a.m.e. in male; *mandibles* vertical, small, fang groove short, one tooth on each margin, fang short from a thick base; *labium* not as long as wide; *maxillae* one-third longer than labium, and in male with tip dilate; *legs* in both male and female, 1–4–3–2, I pair only slightly enlarged, spines, tibia, ventral, 2–2–2, distal, median and basal, middle pair not opposite, prolateral, 3, not in line, retrolateral, 2, metatarsus, ventral, 2–2–2, basal pair very long, prolateral, 1, retrolateral, 1, both distal, III and IV tibiae with dorsal basal spine, III metatarsus with apical whorl, IV metatarsus with apical and median whorls; *palpus* not as long as cephalothorax, tibia shorter than patella, cymbium twice as long as tibia, bulb extends in a constricted lobe on tibia, embolus a curved spine at tip; many iridescent scales on coxae and on legs of both male and female.

Type *Dinattus heros* spec. nov.

The genus *Dinattus* differs from *Agobardus* by the small vertical mandibles with a small tooth on the lower margin, (not bicuspid). Both genera have three pairs of spines on the anterior metatarsi.

Dinattus heros spec. nov.

Figures 39, 47, 50, 54

Male. Length, 6.0 mm., ceph. 3.1 mm. long, 4.0 mm. wide, abd. 3.0 mm.

Cephalothorax chestnut-brown, eye area much darker, cephalic portion moderately high, flat, with a large triangular lobe projecting each side from lateral eyes, so that greatest width at that part is more than length of carapace, a crest of short black hairs from margin of lobe to eye area, seen from the front, the lobe appears flattened with rounded margins, a cluster of three long, curved bristles behind a.l.e. and one long trichobothria anterior to p.l.e. and another posterior to the same eye, a few white iridescent scales between eyes of anterior row and on lateral margins of eye area, lateral margins curved from the triangular lobe to posterior margin, so that posterior margin is about one half the anterior, a deep recurved transverse depression between eyes of third row from which starts the well defined thoracic groove, thoracic area rounded a slight distance behind groove and then falls

abruptly to posterior margin; *eyes*, ocular area covers less than two-fifths of carapace, anterior row strongly recurved by upper margins, eyes equidistant, a.m.e. separated by little more than a line, a.l.e. about two-thirds the diameter of a.m.e., eyes of second row nearer first than third row, p.l.e. slightly larger than a.l.e., elevated from eye area and directed slightly backward; *quadrangle* the same width in front as behind; *clypeus* almost wanting below a.m.e., with no hairs or scales but three long bristles below a.m.e.; *mandibles* dark brown, vertical, moderately large, front surface flat and iridescent with a carina on each margin, outer margin convex, middle margin excavate on distal half, fang groove short with margins poorly defined, superior margin with one long sharp tooth and a scopula of black hairs to base of fang, inferior margin with one sharp tooth, smaller than tooth on opposite margin, fang with a heavy base; *labium* dark brown, not quite as long as wide at base, sides inclined; *maxillae* paler than labium, about one-third longer, tip greatly widened and rounded with a small tooth or lobe on upper outer margin; *sternum* pale brown, slightly convex, almost as wide as long, (3.5 : 4.0), anteriorly little wider than labium, lateral margins emarginate and squarely truncate in front of fourth coxae; *abdomen* oval, flat, dark gray, with six indistinct chevrons on posterior half, entire abdomen covered with short white iridescent scales which change to green in light, and scattered long dark hairs, anterior muscle spots distinct, spinnerets long and closely grouped, venter pale, shaded with gray, a pair of small but very distinct black dots at base of inferior spinnerets, opening of posterior spiracle marked by a curved chitinized lobe; posterior coxae seen from above, thickly covered with large white iridescent scales; *legs*, 1–4–3–2, I pair of legs heaviest, brown, femur very dark on ventral and prolateral sides, flattened laterally, with scattered white scales, patella and tibia with a prolateral brush of short, clavate black hairs, patella two-thirds as long as tibia, metatarsus shorter than tibia, spines, femur, 3 small apical dorsal spines, patella, prolateral, 1, tibia, ventral, 2–2–2, middle pair not opposite, prolateral, 3 small spines not in line, retrolateral, 2, smaller than ventral spines, metatarsus, ventral, 2–2–2, prolateral, 1 small distal, retrolateral, 1 small distal, II pair pale, with femur dark on ventral and prolateral sides, spines, patella, prolateral, 1, tibia, ventral, 2–2–2, median pair not opposite, prolateral, 1, retrolateral, 2, metatarsus, ventral, 2–2–2, prolateral, 1, retrolateral, 1, III pair, pale, spines, patella, lateral, 2, tibia, 1 very small dorsal basal spine, ventral, 2 apical, prolateral, 3, retrolateral, 3, metatarsus, apical whorl, IV pair, pale with broken dark rings on tibia and metatarsus,

spines, patella, lateral, 2, tibia, 1 very small dorsal basal spine, ventral, 2 apical, sub-basal, 1, prolateral, 3, retrolateral, 3, metatarsus with apical and median whorls; *palpus* not as long as cephalothorax, femur dark and slender, patella pale and thickly covered with white iridescent scales, tibia pale, two-thirds as long as patella, ventral and lateral sides with coarse black hairs, tibial apophysis inconspicuous, pressed close to cymbium, terminal joint twice as long as tibia, very slender and covered with coarse black hairs, bulb protruding in a distinct lobe on tibia, embolus a curved black spiral at tip, ending in a groove.

Female. Length, 6.1 mm., ceph. 3.1 mm. long, 2.5 mm. wide, abd. 3.0 mm.

Cephalothorax chestnut-brown, much darker in eye area, lateral margins below eyes slightly rounded in place of the triangular lobe found in the male, so that anterior portion of cephalothorax appears truncate, transverse recurved depression between dorsal eyes as in male, posterior area darker; *eyes* same as in male; *clypeus* below a.m.e. less than half a radius of that eye, no scales or hairs, but three long bristles as in male; *mandibles* pale brown, vertical, rounded in front, smooth, no hairs or bristles, exterior margin rounded but no carina, median margin slightly excavate, fang groove short, teeth and scopula as in male; *labium* and *sternum* as in male; *maxillae* about one-third longer than labium, slightly inclined, with tips and outer margins rounded, palpi inserted on basal half; *abdomen* same as in male, dark covered with small iridescent scales and long dark hairs, venter and sides pale, with gray spots, no chitinized lobe over opening of spiracle; *legs*, 1–4–3–2, pale, I pair heaviest, spines same as in male on all pairs, spines easily seen as joints are pale and I pair has no brush of dark hairs on tibia and patella; palpi pale, dorsal side of tibia and patella with many iridescent scales, terminal joint with long dark hairs and a dorsal crest of longer white hairs; all coxae with dorsal white iridescent scales; *epigynum*, two large circular depressions, separated by a narrow septum, small dark openings at posterior margins of depressions.

Holotype ♂ Haiti; foot hills northeast of La Hotte, 4,000 feet, 3 October 1934, (Darlington)

Allotype ♀ Haiti; foot hills northeast of de la Massif de la Hotte, 3,000–4,000 feet, October 1934, (Darlington)

Paratype ♀ Haiti; La Hotte, Roche Croix, 13 October 1934, (Darlington)

Dinattus erebus spec. nov.

Figure 51

Female. Length, 5.0 mm., ceph. 2.5 mm., abd. 2.5 mm.

Cephalothorax dark brown, ocular area black, no scales and a very few hairs, sides parallel and vertical, thoracic groove short in a circular depression slightly posterior to dorsal eyes, thoracic slope rapid posterior to groove, cephalic portion moderately high; *eyes*, anterior row recurved, eyes equidistant, a.m.e. separated by a little more than a line, a.l.e. more than a radius of a.m.e., small eyes midway between first and third rows, dorsal eyes subequal with a.l.e., convex and on margin of carapace; *quadrangle* as wide behind as in front; *clypeus* more than a radius of a.m.e., with no hairs or scales; *mandibles* dark brown, vertical, rather small, fang groove short, superior margin with one large tooth near median margin and three long bristles near base of fang that are almost parallel to margin, inferior margin with one sharp tooth opposite tooth on upper margin, fang longer than groove; *labium* brown, slightly longer than wide, tip narrowed; *maxillae* not much longer than labium; *sternum* pale brown, convex, almost as wide as long, slightly narrowed between I coxae, IV coxae subcontiguous; *abdomen* oval, dark gray with scattered elongate iridescent scales and a few long dark bristles, venter with three dark converging stripes, spinnerets rather short, compact; *legs*, 4–3–1–2, light brown, no markings, I pair slightly enlarged, spines, patella, 0, tibia, ventral 2–2–2, prolateral, 1, retrolateral, 1, metatarsus, ventral, 2–2–2, basal pair very long, no lateral, III and IV tibiae with a small dorsal basal spine; *epigynum* large, spider has not oviposited, chitinized area wider than long, see figure.

Holotype ♀ Haiti; La Visite, 6,000–7,000 feet, 16–23 September 1934, (Darlington)

The generic position of this spider is very uncertain. The arrangement of the eyes is not the same as in the other species of the genus, as those of the anterior row are not equidistant, the fourth pair of legs is longer than the first, and there are no lateral spines on the anterior metatarsi. The epigynum is very large compared to the size of the spider.

Dinattus minor spec. nov.

Figures 46, 52, 55

Male. Length, 4.6 mm., ceph. 2.3 mm. long, 2.3 mm. wide, abd. 2.3 mm.

Cephalothorax very dark brown, eye area black, cephalic portion very high with large lateral lobes below the lateral eyes, so that the greatest width equals length of carapace, lobes with rounded angles when seen from the front and a crest of short black hairs which starts from the margin of the carapace and continues to near the second eye row, transverse depression between posterior eyes from which starts short thoracic groove, thoracic portion slopes abruptly from a short distance behind the groove, posterior margin much narrower than anterior; *eye area* covers two-fifths of carapace, anterior eye row strongly recurved, eyes equidistant, a.l.e. two-thirds diameter of a.m.e., several long hairs between eyes, second row nearer first than third row, p.l.e. convex, raised from carapace and slightly larger than a.l.e.; *quadrangle* of eyes same width in front as behind; *clypeus* almost wanting below a.m.e., with no hairs or scales, but three long bristles below and between a.m.e.; *mandibles* dark brown, vertical, flat, and corrugated, no carina on either margin, outer margin rounded and inner margin slightly excavate, fang groove short and margins poorly defined, superior margin with one large sharp tooth, one tooth opposite on inferior margin, fang short with a thick and heavy base; *labium* dark, longer than wide, tip narrower than base; *maxillae* about one half longer than labium, tips rounded but not extended in a lobe and no tooth; *sternum* slightly convex, two-thirds as wide as long, anteriorly little wider than labium, pointed in front of IV caxae, laterally emarginate, IV touching; *abdomen* very dark, with five pale chevrons on posterior half, covered with small iridescent scales and long black hairs, venter black from pedicel to spinnerets, a small chitinized lobe over opening of posterior spiracle; *legs*, 1–4–3–2, I pair dark brown and heaviest, femur flattened laterally, spines, patella, prolateral, 1, tibia, ventral, 2–2–2, middle pair not opposite, a few dark ventral hairs, prolateral, 3, retrolateral, 2, metatarsus, ventral, 2–2–2, basal pair very long, prolateral, 1, retrolateral, 1, II pair, pale, spines same as on I pair, III and IV pairs, pale with interrupted dark rings on tibiae and metatarsi, spines, patellae, lateral, 2, tibiae, dorsal basal spine, metatarsi, median and apical whorls; *palpus* shorter than cephalothorax, femur dark, tip of femur, patella and tibia covered with white iridescent scales, terminal joint dark and covered with coarse black hairs, tibia about two-thirds as long as patella, tibial apophysis almost as long as joint, slender and protruding, bulb prolonged on tibia, embolus a curved black spine at tip.

Holotype ♂ Haiti; foot hills northeast of Massif de la Hotte, 3,000–4,000 feet, October 1934, (Darlington)

Dinattus minor differs from *D. heros* by the smaller size, smaller lateral lobes, pointed tip of sternum, black venter and in the palpus, by the longer and more slender tibial apophysis.

Habronattus F.O.P. Cambridge 1901

Habronattus brunneus var. insignis Bryant

Habronattus brunneus var. *insignis* Bryant, 1942, p. 357, figs. 35, 38. "♂ ♀ St. Croix"

The species was described from a male from Key West, Florida and in 1909, Peckham synonymized two western species with it. The variety differs from the typical form by the more brilliant coloring and the secondary characters. The lower half of the clypeus is covered with short white hairs, so there is a sharp line below the anterior eyes. These white hairs are not found in the type from Florida but they are present in *H. tarsalis* (Banks), a western species. The long, ventral basal median spine on the third tibia was over looked in the earlier descriptions of the species, probably because of the short hairs either side. In the female, this spine is much shorter.

♂ Haiti; Port-au-Prince, (Banks), f. Peckham.

♂ 2♀ Haiti; Trou Caiman, 4 September 1934, (Bates)

♀ Haiti; Port-au-Prince, July 1941, (Audant)

♀ Dom. Rep.; south side of Lake Enriquillo, 14 September 1938, (Darlington)

Hentzia Marx 1883

Hentzia antillana Bryant

Hentzia antillana Bryant, 1940, p. 494, figs. 285, 289, 294. "♂ ♀ Antigua" *Wala vernalis* Banks, 1903, p. 341, (*nec Wala vernalis* Peckham.)

Hentzia antillana has been found on several of the islands in the West Indies. From the few localities where it has been taken in Hispaniola, it may be a recent importation.

♀ Haiti; Port-au-Prince, (Crew), Banks Coll.

♂ ♀ Dom. Rep.; Puerto Plata, April-May 1941, (D. Hurst)

♀ Dom. Rep.; Barahora, September 1938, (Darlington)

♀ Dom. Rep.; San José de las Matas, June 1938, (Darlington)

Hentzia peckhami (Cockerell)

Anoka peckhami Cockerell, 1893, p. 221. "Jamaica"
Anoka moneagua Peckham, 1894, p. 127, pl. 12, fig. 9.

Male. Length, 4.4 mm.

Cephalothorax brown with rather wide lateral stripes of white scales from a.l.e. to posterior margin, stripes do not meet, iridescent scales in ocular area above anterior eye row, thoracic groove very short, sides rounded; *eyes*, small eyes nearer first than third row; *quadrangle* as wide behind as in front; *clypeus* very narrow below a.m.e., covered with white scales that connect with lateral stripes; *mandibles* slightly porrect, flat, roughened, narrowed to width of base of fang, each margin with a distinct carina, a few long white hairs at base on prolateral margin, fang groove very oblique, superior margin with two small widely separated teeth, inferior margin with one large sharp tooth midway between two teeth on opposite margin, a deep longitudinal groove from near base of fang to base on under side, fang long, distal third constricted; *abdomen* narrow, median area brown, bordered by narrow stripes of white scales that do not meet at base, venter infuscate with a few iridescent hairs; *legs*, 1–4–2–3, I pair enlarged, no fringe of hairs, dark brown, tarsus paler, at tip of femur a short retrolateral fringe of clavate hairs, that is carried onto patella, spines, patella, prolateral, 1, tibia, ventral, 2–2–2, all from a raised base, metatarsus, ventral, 2–2, II pair, pale, patella, 0, tibia, ventral, 2 distal, 1r–1r, prolateral, 1, metatarsus, ventral, 2–2, III and IV pairs pale, few ventral spines; palpus dark, see figure.

♀ Haiti; Diquini, 12 November 1912, (Mann), f. Peckham

♀ Haiti; Grande Anse, (Uhler)

♂ Haiti; Poste Terre Rouge, 5 October 1934, (Darlington)

♂ Haiti; hills near Port-au-Prince, 2,000 feet, 2 October 1934, (Darlington)

♂ Haiti; foot hills northeast of La Hotte, 3,000–4,000 feet, October 1934, (Darlington)

♂ ♀ Dom. Rep.; foot hills of Cordillera Central, north of Santiago, 1,000–3,000 feet, June 1938, (Darlington)

♀ Dom. Rep.; San José de las Matas, 1,500 feet, August 1938, (Darlington)

♂ Dom. Rep.; Puerto Plata, July 1941, (D. Hurst)

Lyssomanes Hentz 1844

Lyssomanes antillanus Peckham and Wheeler

Lyssomanes antillanus Peckham and Wheeler, 1888, p. 226, pl. 11, fig. 1. "♂ San Domingo, Simon Coll."

Lyssomanes antillanus was described from a male in the Simon Collection labelled "San Domingo." It was found abundantly in the collections from Soledad, Cuba and it also has been reported from Puerto Rico. It is subject to great variation in the width of the median black stripe on the cephalothorax and abdomen.

♂ ♀ Haiti; Grande Riviere, January 1913, (Mann), f. Peckham
♂ ♀ Haiti; Port-au-Prince, (Crew), Banks Coll.
♂ ♀ Haiti; hills near Port-au-Prince, 20 October 1934, (Darlington)
♂ Haiti; Ennery, 1,200 feet, 13 August 1934, (Bates)
♀ Dom. Rep.; San José de las Matas, 1,500 feet, June 1938, (Darlington)
♂ Dom. Rep.; Constanza, Cordillera Central, 3,000–4,000 feet, August 1938, (Darlington)
♂ ♀ Dom. Rep.; Puerto Plata, 30 August 1938, (Darlington)

Menemerus Simon 1868

Menemerus bivittatus (Dufour)

Salticus bivittatus Dufour, 1831, p. 369 pl. 11, fig. 5. "♀ Hispania"

This is a common cosmotropical species that has often been described and figured. It is common on buildings as well as on trees and shrubs.

♂ Haiti; Port-au-Prince, July 1941, (Audant)
♂ ♀ Haiti; Port-au-Prince, June-July 1941, (Ducasse)
♂ Haiti; Miragoane, 2 November 1934, (Darlington)
♂ ♀ Dom. Rep.; Puerto Plata, July-August 1941, (D. Hurst)

Metacyrba F.O.P.-Cambridge 1901

Metacyrba pictipes Banks

Figure 49

Metacyrba pictipes Banks, 1903, p. 343, pl. 15, fig. 7. "♂ Hayti"

Male. Length, 3.8 mm., ceph. 1.7 mm.

Cephalothorax very dark brown, low, cephalic portion flat, no thor-

acic groove, sides rounded, posterior margin about one half the anterior, a few bristles on lateral margins of cephalic portion; *eyes*, anterior row straight by upper margins, eyes equidistant, a.l.e. about a radius of a.m.e. and separated from them by a radius of a.l.e., small eyes nearer first than third row, dorsal eyes subequal to a.l.e., on extreme margin of carapace; *quadrangle* slightly wider behind than in front; *clypeus* less than one half radius of a.m.e., with no hairs or scales; *mandibles* dark, vertical, small and cone-shaped, fang groove horizontal, short, inferior margin with one tooth, fang with a broad base; *labium* dark brown, more than twice as long as wide; *maxillae* more than twice as long as labium; *sternum* dark brown, more than twice as long as wide, narrowed between first coxae to width of the labium, sides almost parallel; *abdomen* dark brown, much shrunken so that all markings are obscured, a small dark brown basal scutum, venter dark; *legs*, 4–1–3–2, all joints but tarsi a dark brown with scattered white scales, all patellae without spines, I pair strongly incrassate, femur flattened both laterally and ventrally, spines, tibia, ventral, 2–2, on distal third, short and stout, metatarsus, ventral, 2–2, distal and median, II pair, spines, tibia, ventral, 2, distal, 1r, metatarsus, ventral, 2–2, basal pair very long, III and IV pairs, spines same as on II pair; *palpus* shorter than cephalothorax, dark brown, tibia shorter than patella, not as long as diameter of joint, tibial apophysis longer than diameter of joint, almost at right angles, distal third very slender, bulb large and heavy, protruding from cavity, embolus starts from retrolateral margin, follows contour of cavity and ends in a straight, slender point at tip of cavity.

Holotype ♂ Haiti; Port-au-Prince, (Crew), Banks Coll.

The type is very much discolored and shrunken from age but it is the only specimen known.

Metacyrba taeniola (Hentz)

Attus taeniola Hentz, 1846, p. 353, pl. 21, fig. 5. "♀ North Carolina, Alabama"
Metacyrba taeniola Peckham, 1909, p. 486, pl. 39, fig. 5, pl. 40, fig. 4.

This species is common in the southern part of the United States and Mexico. Banks did not have it from Port-au-Prince in 1903, and Petrunkevitch did not report it from Puerto Rico. Both males and females have been found in collections from Cuba.

Two females have been seen from Hispaniola. The number of spines on the first tibia is subject to much variation. There are usually two pairs of small spines but some times there is only a single

spine. The metatarsus has two pairs. The specimen from Ennery, collected by Mann in 1913, has but one very small spine, on the first tibia, that could be easily over looked and none on the metatarsus. This, Peckham had marked, "spec. nov." but the epigynum agrees perfectly with the specimens from the United States.

♂ Haiti; Ennery, 1913, (Mann), f. Peckham

♂ Haiti; Miragoane, 2 November 1934, (Darlington)

Metaphidippus F.O.P.-Cambridge 1901

Metaphidippus prudens (Peckham)

Figures 56, 57, 63

Dendryphantes prudens Peckham, 1901, p. 15, pl. 4, fig. 13. "♂ ♀ Jamaica"

Male. Length, 4.2 mm., ceph. 2.1 mm. long, 1.8 mm. wide, abd. 2.3 mm.

Cephalothorax brown, with quite a wide lateral stripe of yellowish-white scales starting from a.l.e. but not meeting at posterior margin, a few white scales above anterior eye row, eyes on black spots, carapace moderately high, sides rounded, widest posterior to dorsal eyes, thoracic groove very short; *eyes*, anterior row recurved, a.m.e. almost touching, a.l.e. less than a radius of a.m.e. and separated from them by about a line, small eyes slightly nearer the first than the third row, dorsal eyes slightly larger than a.l.e. and not on extreme margin of carapace; *quadrangle* slightly wider behind than in front; *clypeus* little more than a line below a.m.e.; *mandibles* reddish-brown, with a few white scales on median margin, vertical, median margin parallel at basal third, with distal two-thirds excavate, fang groove oblique, superior margin with two contiguous teeth near median margin, inferior margin with one sharp tooth opposite teeth on upper margin, fang long and rather stout until near tip; *labium* dark brown, as long as wide; *maxillae* more than twice as long as labium, with upper outer corner prolonged in a point; *abdomen* oval, a short basal band of white scales, a median brown branching stripe that connects on distal half with the dark sides, this forms the two or three pairs of pale spots figured by Peckham, venter dark with two pale, widely separated stripes; *legs*, 1–4–2–3, I pair, femur dark, slightly enlarged and laterally compressed, other joints pale, with vague dark rings at distal ends, spines, patella, 0, tibia, ventral, 2–2–2, inner row confined to distal half, outer row longer, metatarsus, ventral, 2–2, other legs pale with broad dark bands at distal ends of each joint, no patella spines, no

dorsal basal spine on posterior tibiae; *palpus* shorter than cephalothorax, tibia shorter than patella, tibial apophysis a small dark pointed spur, bulb extends on tibia, embolus a stout truncate lobe at tip, twice as long as wide, bowed from the plane of the palpus, with a slight shoulder about the middle on the prolateral side, the retrolateral corner of the lobe longer.

Female. Length, 4.2 mm., ceph. 2.0 mm., abd. 2.6 mm.

Cephalothorax not as much widened as in the male but the coloring the same; *eyes* same as in male; *mandibles* smaller than in male and inner margin not excavate, fang groove horizontal, one sharp tooth on inferior margin; *maxillae* not widened at tips; *abdomen* oval, basal pale band with no white scales, median dark stripe heavier and margins irregular, venter dark with the two widely separated pale stripes; *legs*, 4–1–2–3, I pair only slightly enlarged, spines same as on male; *epigynum*, a deep notch at posterior margin, with two chitinized loops at anterior end with the heavier portions near middle.

♂ ♀ Haiti; Kenskoff, 4,300 feet, (Roys)

♂ Haiti; hills near Port-au-Prince, 2 October 1934, (Darlington)

♂ Haiti; Diquini, (Mann)

♂ Dom. Rep.; San José de las Matas, June 1938, (Darlington)

The types, (2♂ and 1♀) are from Kingston, Jamaica and are in the Museum of Comparative Zoölogy Collection. Probably, at some time they have been dried, as all color pattern has disappeared. The structure of the palpi and the epigynum however, can be plainly seen and they agree perfectly with the more recently collected specimens from Haiti. The figure of the abdomen shows almost no pattern but the two or three pairs of white spots.

Nebridia Simon 1902

Nebridia manni spec. nov.

Figures 48, 61, 64, 66

Male. Length, 3.0 mm., ceph. 1.6 mm. long, 1.0 mm. wide, abd. 1.5 mm.

Cephalothorax dark brown, ocular area almost black, a narrow marginal line of white hairs and a few white hairs posterior to thoracic groove, cephalothorax fairly high, highest at dorsal eyes, ocular area flat, sides vertical and parallel, a circular depression slightly posterior to dorsal eyes with a short thoracic groove, thoracic portion only slightly lower than cephalic for first third, then slopes gradually to

posterior margin; *eyes*, anterior row slightly recurved by upper margins, eyes equidistant, a.l.e. little more than a radius of a.m.e., small eyes midway between first and third rows, dorsal eyes convex, on extreme margin of carapace, subequal to a.l.e.; *quadrangle* slightly narrower behind than in front; *clypeus* little more than a line below a.m.e., retreating; *mandibles* dark brown, vertical, no hairs or scales, fang groove slightly oblique, superior margin with one large tooth and a denticle each side, inferior margin with a long plate that covers about half the margin, tip farthest from base of fang long, fang longer than margin; *labium* dark brown, as long as wide; *maxillae* more than twice as long as labium, tips widened but not extended in a lobe; *sternum* dark brown, convex, two-thirds as wide as long, IV coxae touching; *abdomen* oval, pale brown, with vague longitudinal dark stripes at base and broken chevrons at tip, venter infuscate; *legs*, 4–3–1–2, I pair slightly enlarged, dark brown, with pale tarsus, tibia with a short ventral fringe, spines, patella, 0, tibia, ventral, 2 distal only can be seen, because of the dark integument and fringe, metatarsus, ventral, 2–2, basal pair as long as joint, II pair same as I pair but smaller, III and IV pairs, femora and metatarsi with a wide median pale band, very few spines; *palpus* shorter than cephalothorax, white, with lateral brush of white hairs on distal half of femur and on patella and tibia, patella longer than tibia, tibial apophysis a long slender spur with a dark tip, parallel to cymbium, bulb extends in a lobe and about covers tibia, embolus a spiral tube at tip.

Female. Length, 3.6 mm., ceph. 1.6 mm. long, 1.0 mm. wide, abd. 1.9 mm.

Cephalothorax and *eyes* same as in male; *mandibles* dark, superior margin with one sharp tooth, inferior margin with a large bicuspid tooth, point farthest from base of fang longest; *abdomen* oval, three-quarters as wide as long, dark brown, probably in life covered with small iridescent scales as a few remain at base, a median brown pale stripe from base to beyond the middle, with broad dark marks each side, posterior pairs joined to form chevrons, venter infuscate; *legs*, I right missing, 4–3–1–2, dark brown, all tarsi pale and short, I pair slightly enlarged, spines, tibia, ventral, 2–2–2, no lateral, metatarsus, ventral, 2–2, basal pair longer than joint, no lateral, II pair, tibia, ventral, 2 distal, 1–1 prolateral, no lateral, metatarsus, ventral, 2–2, posterior pairs with very few spines; *palpi* pale, swollen and covered with white hairs; *epigynum* large for so small a spider, area wider than long with complicated tubes and sacs beneath the skin, see figure.

Holotype ♂ Haiti; foot hills of La Hotte, 3,000–4,000 feet, 13 October 1934, (Darlington)

Allotype ♀ Haiti; La Hotte, Roche Croix, 13 October 1934, (Darlington)

Paratype ♀ Haiti; La Hotte, Roche Croix, 13 October 1934, (Darlington)

Paratype ♀ Haiti; La Visite, 6,000–7,000 feet, 16–23 September 1934, (Darlington)

Paratype ♂ ♀ Haiti; Ennery, 7 September 1934, (Darlington)

Paratype ♀ Haiti; Ennery, December 1912, (Mann)

Paratype ♀ Haiti; Dame-Maria, 1941, (Audant)

The genus *Nebridia* was based by Simon on one species, *Nebridia semicana* from Venezuela, known only from the male. From the brief description, it differs in several points from the two species found in Hispaniola. *Nebridia semicana* is described with the thoracic groove midway between the dorsal eyes and the posterior margin, and the tibial apophysis of the palpus short and bilobed. In the two species now described, the thoracic groove is much nearer the dorsal eyes than to the posterior margin, and the tibial apophysis is long and slender.

However, they all agree in the very small size, the narrow clypeus, quadrangle narrower behind, fourth pair of legs longer than the first, no lateral spines on tibiae and metatarsi, few spines on the posterior pairs and the short male palpus with the bulb almost covering the tibia.

Nebridia mendica spec. nov.

Figures 62, 65

Male. Length, 3.0 mm., ceph. 1.2 mm. long, 0.6 mm. wide, abd. 1.6 mm.

Cephalothorax chestnut-brown, cephalic portion much darker, a narrow marginal line of white scales and a few narrow white scales on ocular area, rather low, sides parallel, ocular area flat, thoracic groove well behind the dorsal eyes, short, slope gradual from groove to posterior margin; *eyes*, anterior row recurved by upper margins, eyes equidistant, separated by a line, a.m.e. large, a.l.e. about a radius of a.m.e., small eyes midway between first and third rows, dorsal eyes on extreme margin of carapace, larger than a.l.e., convex; *quadrangle* slightly narrower behind; *clypeus* less than a radius of a.m.e.; *mandibles* dark brown, vertical, flat, fang groove horizontal, superior margin with one small tooth, inferior margin with a large bicuspid tooth, fang

longer than groove; *labium* dark brown about as wide as long; *maxillae* more than twice as long as labium, tips slightly dilated; *sternum* brown, oval, convex, two-thirds as wide as long, IV coxae contiguous; *abdomen* oval, more than half as wide as long, brown, with a median darker brown branched stripe, the transverse bars most prominent on posterior half, venter infuscate, darker about spinnerets, spinnerets dark brown and closely grouped; *legs*, I left missing, 4–3–1–2, I pair enlarged, dark brown, femur flattened, tarsus and metatarsus short, spines, tibia, enlarged, ventral, 3 on prolateral side, a median brush of short dark hairs, 2 distal spines on retrolateral side, metatarsus, ventral, 2–2, distal pair very long, II pair much paler, spines, tibia, ventral, prolateral, 1–1–1, metatarsus, ventral, 2–2, III and IV pairs, pale, with a few spines on metatarsi, distal whorl; *palpus* shorter than cephalothorax, brown, femur curved, tibia shorter than patella, tibial apophysis a long, slender dark spine pressed close to cymbium, bulb extends in lobe on tibia, embolus a dark spine at tip in a spiral curve.

Holotype ♂ Dom. Rep.; rain forest near Valle Nuevo, Cordillera Central, 6,000 feet, August 1938, (Darlington)

While *Nebridia mendica* is about the same length as *N. manni* it is more slender and darker, with the thoracic groove well behind the dorsal eyes. The abdomen has a branched figure on the dorsum and the palpus is all dark, while in *N. manni* the palpus is pale. Both have the same type of palpus, with the distal half of the tibial apophysis constricted and the bulb protruding from the cavity and almost covering the tibia.

Oningis Simon 1901

Oningis armatus spec. nov.

Figures 70, 73

Male. Length, 2.8 mm., ceph. 1.5 mm. long, 1.1 mm. wide, abd. 1.2 mm.

Cephalothorax chestnut-brown, eye area darker, no marginal pale stripe, scattered white scales in ocular area, cephalothorax high, highest posterior to thoracic groove where it slopes gently to the anterior margin and to within a quarter of the posterior margin when it falls rapidly, sides parallel and vertical, a faint depression between dorsal eyes, thoracic groove very faint, just posterior to eyes; *eyes*, anterior row slightly recurved by upper margins, eyes equidistant, a.m.e. very large and almost touching, a.l.e. about a radius of a.m.e.,

small eyes midway between first and third rows, dorsal eyes slightly larger than a.l.e., convex, and not quite on margin of carapace; *quadrangle* slightly narrower behind than in front; *clypeus* about half a radius of a.m.e., no hairs or scales; *mandibles* dark brown, vertical, rather small, fang groove horizontal, one sharp tooth on inferior margin, fang slightly longer than groove; *labium* longer than wide; *maxillae* about twice as long as labium, sides parallel, tips not dilated; *sternum* dark brown, convex, more than three-quarters as wide as long, IV coxae almost touching; *abdomen* oval, pale, mottled with brown, with three dark chevrons on posterior half, venter brown, with a pair of indistinct, widely separated lateral pale stripes and two pairs of pale spots in middle area; *legs*, III left missing, 4–3–1–2, brown with pale tarsi, no rings or stripes, I pair slightly enlarged, femur flattened laterally, spines, all from a raised base, patella, 0, tibia, ventral, 2–2–2, those on prolateral side long and overlapping no lateral or dorsal, metatarsus, ventral, 2–2, basal pair as long as joint, distal pair reaching tip of tarsus, no lateral, II pair, spines, same as on I pair, except tibia, prolateral, 1, metatarsus, prolateral, 2, few spines on posterior pairs, I, II and III tibiae longer than metatarsi, IV metatarsus longer than tibia; *palpus* shorter than cephalothorax, tibia shorter than patella, tibial apophysis a small curved spine half hidden by the basal lobe of the bulb, tibia with a very large swollen prolateral lobe, cymbium as long as tibia plus patella, bulb extends on tibia in a large lobe, embolus a short, slender black spine at tip.

Female. Length, 2.7 mm., ceph. 1.6 mm. long, 1.2 mm. wide, abd. 1.8 mm.

Cephalothorax, *eyes* and *mouth parts* same as in male; *abdomen* with pattern more definitely marked but the three chevrons on the posterior half the most distinct, basal half of alternate dark and pale stripes, venter pale, clouded with a darker brown; *legs*, 4–3–1–2, tarsi shorter than metatarsi, spines same as in male; *epigynum*, chitinized area wider than long, convex, posterior margin faintly notched in the middle, with two small oval darkened spots near anterior margin.

Holotype ♂ Dom. Rep.; Loma Rucilla Mountains, Cordillera Central, 5,000–8,000 feet, June 1938, (Darlington)

Allotype ♀ Dom. Rep.; Loma Rucilla Mountains, 5,000–8,000 feet, June 1938, (Darlington)

Paratype ♂ Dom. Rep.; Loma Rucilla Mountains, 5,000–8,000 feet, June 1938, (Darlington)

ONINGIS CRASSUS spec. nov.

Figures 58, 60, 67

Male. Length, 2.5 mm., ceph. 1.3 mm. long, abd. 1.2 mm.

Cephalothorax brown, darker about the eyes, a stripe of white hairs from a.l.e. on sides, a brown median line of white hairs from thoracic groove to posterior margin, cephalic portion high, anterior margin four-fifths of entire length, sides parallel to p.l.e., then gradually narrowing to posterior margin which is a little more than half the anterior, eye area flat, a circular depression between dorsal eyes from which starts the short thoracic groove, thoracic portion slopes gradually from groove to margin; *eyes* cover almost half the carapace, anterior row recurved by upper margin, a.m.e. large, touching, a.l.e. less than a radius of a.m.e. and separated from them by a line, small eyes nearer third row than first, dorsal eyes on extreme margin of carapace, convex and larger than a.l.e.; *quadrangle* of eyes narrower behind than in front; *clypeus* almost wanting below a.m.e., white hairs beneath a.l.e.; *mandibles* dark brown, with a green iridescence, small, vertical, front flat, a small tooth or cusp on exterior margin two-thirds from base, median area excavate, fang groove horizontal, one small tooth on inferior margin, fang longer than groove and evenly curved; *labium* brown, longer than wide; *maxillae* twice as long as labium, sides parallel, no exterior lobe; *sternum* brown, convex, oval, four-fifths as wide as long, I coxae separated by a diameter and a half, largest, twice as long as wide, trochanter more than half as long as coxa, IV coxae contiguous; *abdomen* brown, with a narrow basal band of white hairs that continues on sides to spinnerets and a narrow median stripe of white hairs from base to almost the middle, on posterior half of dorsum, very small iridescent scales, venter dull brown, opening of posterior spiracle a short, straight slit anterior to spinnerets, spinnerets brown, long and compact; *legs*, 4–1–3–2, I left missing, I pair enlarged, femur flattened laterally, brown, iridescent on prolateral side, patella, pale, tibia and metatarsus pale brown, tarsus pale, little over one-half as long as metatarsus, spines, patella, 0, tibia, ventral, 2–2–2, all from a raised base and longer than diameter of the joint, middle pair longest, metatarsus, ventral, 2–2, basal pair two-thirds as long as joint, II pair, femur brown, flattened laterally and iridescent on prolateral side, other joints pale, spines, patella, 0, tibia, ventral, 2–2, 1r, retrolateral row of spines very long, prolateral, 1, metatarsus, ventral, 2–2, prolateral, 2, III and IV pairs, no dorsal basal spine on tibiae, femora dark, other joints pale, spines, metatarsi,

ventral, 2 apical; *palpus* shorter than cephalothorax, distal half of femur, patella and tibia white, with soft white hairs, terminal joint brown, with a prolateral fringe of stiff hairs beyond the cavity, both patella and tibia short, subequal, tibial apophysis longer than diameter of joint, slender, parallel to cymbium, ending in a dark hook, bulb extending on tibia, embolus a spiral curve at tip.

Female. Length, 2.8 mm., ceph. 1.4 mm. long, 1.1 mm. wide, abd. 1.4 mm.

Cephalothorax and *eyes* same as in male; *mandibles* pale brown, vertical, flat, no tooth on exterior margin, fang groove horizontal, inferior margin with a broad plate or cusp near median edge, end nearer base of fang in a sharp point, fang longer than groove; *mouth parts* and *sternum* same as in male; I coxae largest, trochanter half as long as coxa; *abdomen* oval, brown, basal band and median stripe difficult to follow as there are no white hairs, five dark chevrons on posterior half, and sides with alternate pale and dark lines, no iridescent scales as in male, venter pale; *legs*, 4–1–3–2, I left missing, pale brown, I pair slightly enlarged, femur not iridescent, spines as in male but metatarsal spines longer, II pair, spines, tibia, ventral, 2–2–2, outer row of spines very long from a raised base, overlapping, inner row of spines, very small, prolateral, 1, metatarsus, ventral, 2–2, prolateral, 2, III and IV pairs, pale, spines, metatarsi, ventral, 2 apical; *epigynum* large for the size of the spider, area longer than wide, a semicircular depression with chitinized margins enclosing two depressed areas separated by a narrow septum.

Holotype ♂ Dom. Rep.; Sanchez, July 1938, (Darlington)

Allotype ♀ Dom. Rep.; Sanchez, July 1938, (Darlington)

Paratype ♀ Dom. Rep.; Loma Rucilla Mountains, 5,000–8,000 feet, June 1938, (Darlington)

Paratype ♀ Haiti; Ennery, 7 September 1934, (Darlington)

The genus was based by Simon on one species, *Neon pompatus* Peckham, 1893, from St. Vincent. The original description is very meager and possibly Simon saw the types in the British Museum, as he mentions in the generic description several characters that are not noted in either the original description or figures. A female cotype is in the Museum of Comparative Zoölogy Collection.

The genus is placed near *Saitis*, which has short tarsi but it differs from that genus by almost no spines on the posterior legs. *Oningis pompatus* has a submedian ventral spine on the posterior tibiae, as well as the apical pair on the metatarsi. The cotype, also, has a lateral spine on the first tibia.

The figure of the palpus of *Oningis pompatus* is quite unlike the palpus of *O. crassus* or *O. minutus* Petrunkevitch from Puerto Rico, the only other species in the genus. In *pompatus*, the embolus starts from the base and continues as a long slender tube to the tip, and the bulb does not extend on the tibia. In *minutus* and *crassus* the embolus is a spiral curve at the tip and the bulb extends onto the tibia. These two probably belong to the same genus, although in the description of *minutus* there is no mention of the difference in size of the spines on the second tibia, and in *minutus* female, the tooth on the lower margin of the fang groove is pointed and strong.

In *Oningis crassus*, the male and the female have very different mandibles. As in so many of the Haitian species, the male mandibles have a cusp on the exterior margin and the median margin is excavate. Also, in the male, the tooth on the lower margin of the fang groove is small and sharp. In the female, the mandibles are small and the tooth on the fang groove is a plate that covers about one third of the margin. The spines however, are the same in both male and female and there is even a greater discrepancy in size between the inner and outer row of spines on the second tibia in the female than in the male.

Parahentzia gen. nov.

Cephalothorax rather low, sides rounded, almost as wide as long, cephalic portion not separated from thoracic, groove very short, midway between anterior and posterior margins; *mandibles* in male vertical, very broad, tooth or cusp on exterior margin that projects forward, about midway between base and fang, fang groove parallel to median margin and fang when in place, parallel to median margin as in *Hentzia; labium* twice as long as wide, with sides depressed and a small pit in depressed area each side above the base; *sternum* almost as wide as long; first pair of legs enlarged, spines, tibia, ventral, 2–2–2, as in *Metaphidippus*, metatarsus, ventral, 2–2, few spines on posterior legs, no dorsal basal spine on tibiae, apical whorl of four spines on third and fourth metatarsi; *palpus* of the *Hentzia* type.

Genotype *Parahentzia mandibularis* spec. nov.

The genus, known only from the male, differs from *Hentzia* in the very broad cephalothorax with rounded sides, broad, vertical mandibles with a tooth on the outer margin, broad sternum, with the enlarged first pair of legs. It agrees with that genus in the second row of eyes being nearer the first than the third row, a very short thoracic

groove midway between anterior and posterior margins of the carapace, and the palpus.

Parahentzia mandibularis spec. nov.

Figures 68, 69, 71

Male. Length, 5.6 mm., ceph. 2.1 mm. long, 2.0 mm. wide, abd. 3.1 mm.

Cephalothorax chestnut-brown, with a few white scales above anterior eye row and on sides, eyes surrounded by black, cephalothorax rather low, eye area slightly raised and flat, sides very much rounded, greatest width at thoracic groove, posterior margin narrow, thoracic groove very short, as near posterior margin as to anterior, groove in a slight depression; *eyes*, anterior row recurved, a.m.e. separated by a line, a.l.e. about one-third diameter of a.m.e. and separated from them by a radius of a.l.e., small eyes nearer first than third row, a.l.e. subequal with a.l.e. and well in from margin of carapace; *quadrangle* slightly wider behind than in front and covering about two-thirds of carapace; *clypeus* wanting below a.m.e., margin with a few hairs; *mandibles* brown, vertical, flat, with a strong carina on median margin, exterior margin with a basal lateral lobe, and about the middle, a strong tooth or cusp directed outward from the plane, and best seen in a lateral view, area from base to tooth on exterior margin concave, tip contracted to width of fang, fang groove about parallel to median margin, above base of fang are two sharp spicules on one mandible only, which may be teeth, inferior margin with a strong carina, fang long and sinuous and when in place, sharply bent and about parallel to median margin; *labium* brown, almost twice as long as wide, lateral margins inclined, and depressed, leaving a flat median area from base to tip, in lateral depressions are two circular pits; *maxillae* twice as long as labium, margins by labium concave, tips widened and truncate, with upper margins straight and upper outer corner prolonged in a hook or tooth; *sternum* brown, very convex, nearly as wide as long, (3.0:3.5), anteriorly narrowed to width of labium, with semi-circular depressed areas each side parallel to coxae, (sigillae) and median part little wider than median piece of labium, lateral margins almost parallel, with a blunt point in front of IV coxae; *abdomen* long and narrow, brown, with a pair of widely separated narrow stripes of white scales, in area between stripes four pairs of dark brown spots can be traced, entire abdomen with scattered long hairs, venter same color as dorsum, no

lobe over posterior spiracle, spinnerets closely grouped; *legs*, 1–4–2–3, I pair enlarged, dark brown, with metatarsus pale, all joints with few hairs and no scales, femur flattened laterally, with prolateral side much darker, a scant retrolateral fringe at tip of femur and on patella, spines, patella, prolateral, 1, tibia, ventral, 2–2–2, not opposite, spines on inner row heavier, basal spine just below middle, basal spine on outer row one third above base, metatarsus, ventral, 2–2, distal and sub-median, II pair pale yellow, spines, patella, 0, tibia, ventral, distal, 2, sub-median, 1, III and IV pairs, pale yellow, very few spines, metatarsi with distal whorl of 4 spines; *palpus* of the type of *Hentzia*, little shorter than cephalothorax, very slender, femur bent, patella little longer than wide, tibia seen from above about half as long as patella, tibial apophysis black, sharp and pressed close to cymbium, tarsus little longer than patella plus tibia, bulb extends on tibia, embolus starts on prolateral side near tip, a very slender black spine.

Holotype ♂ Dom. Rep.; foot hills of Cordillera Central, south of Santiago, 1,000–3,000 feet, June 1938, (Darlington)

Paratype ♂ Haiti; Port-au-Prince, July 1941, (Ducasse)

Parahentzia mandibularis has some characters that are very unusual in *Saltieidae*. The deep lateral pits on the labium near the base have been seen in a few Haitian species and the pair of semi-circular depressions at the anterior end of the sternum is found in some species of *Clubionidae* from Panama. The lateral tooth on the exterior margin of the mandibles, evidently varies in size as in the paratype from Port-au-Prince, it is only a large hump but it can be seen in a lateral view.

Parathiodina gen. nov.

Cephalothorax rather high, sides rounded, widest posterior to dorsal eyes, thoracic groove in line with dorsal eyes, posterior half of thoracic portion falls abruptly to margin, posterior margin less than half the anterior; *eyes* of anterior row equidistant, very unequal in size, second row of eyes nearer first than third row, dorsal eyes not on extreme margin of carapace; *quadrangle* of eyes wider behind than in front; *maxillae* not widened at tip; *legs*, 1–4–3–2, first pair enlarged, tibia with two pairs of very long bulbous hairs at base, spines, apical whorl of four spines on third and fourth metatarsi; *palpus*s horter than cephalothorax, tibial apophysis and palpal organ of the type of *Thiodina*. Female unknown.

Genotype *Parathiodina compta* spec. nov.

The genus *Parathiodina* is separated from *Thiodina* by a wider cephalothorax, quadrangle wider behind than in front, and fewer spines on posterior legs. It is separated from *Cotinusa* by the higher cephalothorax, thoracic groove almost in line with the dorsal eyes and two pairs of bulbous hairs on the first tibiae, and from *Ceriomura* by the spines on the posterior legs.

In the Histoire Naturelle des Araignées, **2**, pp. 454 and 456, Simon states that all species of the genus *Cotinusa* lack these bulbous hairs. The genotype, *Cotinusa distincta* (Peckham), lacks these hairs and in the paper where the genus was first described, Simon proposed five additional species from Venezuela and Brazil. Two of these have the bulbous hairs, one has the hairs lacking and the other two have no mention of them. So it is possible that the two with the bulbous hairs should be transferred to the genus *Parathiodina*.

Parathiodina compta spec. nov.

Figures 42, 45

Nilacantha coekerelli Banks, 1903, p. 341, (*nec* Peckham, 1901)

Male. Length, 5.5 mm., ceph. 2.4 mm. long, 1.6 mm. wide, abd. 3.0 mm.

Cephalothorax golden-brown, eyes on black spots, nearly as wide as long, (6 : 7), cephalic portion rather high, flat, sides nearly vertical, with many white hairs, widest posterior to dorsal eyes, so sides are rounded, a transverse recurved depression posterior to p.l.e., thoracic groove faint, almost in line with dorsal eyes, thoracic portion almost twice as long as cephalic and posterior margin much narrowed; *eyes*, anterior row slightly recurved by upper margins, eyes equidistant, a.m.e. very large, convex, separated by little more than a line, a.l.e. less than a radius of a.m.e. in diameter, second row much nearer first than third row, p.l.e. convex and slightly larger than a.l.e.; *quadrangle* as wide behind as in front; *clypeus* dark, below a.m.e. little more than a line, fringe of white hairs on margin; *mandibles* dark, vertical, rather small, fang groove slightly oblique, superior margin with three small contiguous teeth, inferior margin with one strong tooth, fang with a thick base, narrows suddenly, so that distal two-thirds is very slender, no tooth; *labium* dark, as long as wide; *maxillae* almost twice as long as labium, tips only slightly widened and outer margins rounded; *sternum* brown, anteriorly narrowed to width of labium between I coxae, sides parallel, tip pointed, IV coxae touching; *abdomen* about

one-third as wide as long, a dull brown with median area paler, sides with a few dark spots, each bearing a short hair, venter dark from pedicel to spinnerets; *legs*, 1–4–3–2, I and II pairs enlarged, I pair heaviest, femur dark brown, flattened laterally and ventrally, with a violet iridescence on ventral side and a carina on each margin, the retrolateral heavier, patella and tibia paler, and metatarsus and tarsus very pale, spines, patella, prolateral, 1, tibia, ventral, 2 sub-apical, 1p, all spines very short, 2 pairs of slender bulbous hairs half the length of the joint on basal half, difficult to see as they are in a mass of short black hairs, metatarsus, ventral, 2–2, very short, II pair, femur flattened ventrally with a violet iridescence, spines, patella, prolateral, 1, tibia, ventral, 1r–1r–1r, metatarsus, ventral, 2–2, III and IV pairs, pale, with few spines, patellae, 0, tibiae, no dorsal basal spine, metatarsi, an apical whorl of 4 spines, IV pair plainly longer than III pair; *palpus*, dark, very small, shorter than cephalothorax, tibia shorter than patella, tibial apophysis bifid with superior branch short and truncate, inferior dark, slender and sinuate, large ventral lobe protruding from basal half, best seen in profile, bulb large, but not extending beyond cavity, embolus a long slightly curved spine on prolateral side, which almost reaches tip of cavity.

Holotype ♂ Haiti; Camp Perrin, 9 October 1934, (Darlington)

Paratype ♂ Haiti; 25 km. north of Port-au-Prince, 25 October 1934, (Darlington)

Holotype ♂ Haiti; Poste Terre Rouge, 15 October 1934, (Darlington)

Paratype ♂ Haiti; Port-au-Prince, (Crew), Banks Coll.

Pensacola Peckham 1885

The genus *Pensacola* was erected by the Peckhams in 1885, for *signata*, a species known by both males and females from Guatemala. Since then, Simon has described several other species from Brazil, and two species of the Peckhams, described as *Hamillus radians* and *sylvestris* have been added to the genus. The Peckham types are now in the Museum Collection, and as F.O.P.-Cambridge suggests, *Pensacola signata* and *Hamillus sylvestris*, are synonymous.

The type, *Pensacola signata*, differs in several points from the species found in Hispaniola and eventually the latter species may prove to be a separate genus. The genotype has the cephalothorax quite short compared to the width and the sternum is very narrow; the mandibles are very long, narrow at the base, widening on each margin with a heavy carina on the exterior margin with a faint tooth about the

middle, this tooth was not noted in the original description; the tooth on the median margin is long and slender and the area below is concave, rather than excavate; the maxillae, while greatly widened are pointed, not truncate. The different spacing of spines on the first tibia is not marked as in the island species. The second spine on the inner row is more than its length from the apical and the spine on the outer row is nearly opposite. The third pair is basal.

The five species found in Hispaniola have a much longer cephalothorax, and wider sternum; the mandibles, with the exception of *electa* have more processes; the maxillae in all species are greatly widened with the lateral margins truncate, not pointed.

Key to Pensacola Males

1. Mandibles with no tooth on median margin or exterior margin 2
   Mandibles with tooth on median margin and exterior margin 3
2. A diagonal carina from middle of median margin to base of fang with distal slightly depressed ..... *maxillosa*
   Mandibles with no transverse carina, narrowed on distal third to width of fang ..... *electa*
3. Median margin of mandibles with a long tooth that almost reaches fang groove ..... *peckhami*
   Median margin of mandibles with a short tooth 4
4. Median margin of mandibles with two teeth, basal tooth short, distal tooth long and bent at right angles ..... *darlingtoni*
   Median margin of mandibles with one short tooth near base, area below depressed ..... *montana*

PENSACOLA DARLINGTONI spec. nov.

Figures 72, 74, 76

Male. Length, 6.0 mm., ceph. 3.1 mm. long, 2.5 mm. wide, abd. 2.6 mm.

Cephalothorax brown, with wide pale lateral stripes and a pale median stripe from groove to posterior margin, the pale stripes with many white scales, cephalic portion high, with a shallow recurved depression between dorsal eyes from which starts the short thoracic groove, a pair of long trichobothria just posterior to groove, thoracic portion slopes gradually from groove for a short space and then falls abruptly to margin, sides of thoracic portion concave; *eye area* flat, covers two-fifths of carapace, anterior row of eyes recurved by upper

margins, a.l.e. less than a radius of a.m.e., a.m.e. separated by a line, a.l.e. separated from a.m.e. by a radius of a.l.e., above a.m.e. a thick fringe of white hairs which extends between a.m.e. and a.l.e., several long hairs over anterior eyes, small eyes midway between first and third rows, p.l.e. not on extreme margin of carapace, subequal with a.l.e., raised and directed slightly backward; *quadrangle* not as wide behind as in front; *clypeus* very narrow, less than half a radius of a.m.e., with long white hairs below a.l.e. that are directed forward and a thick fringe of long white hairs on margin; *mandibles* pale brown, vertical, about half as long as carapace, with median margins deeply excavate and modified by various processes best understood from figure, lower median process bent midway at right angles to the plane of the mandibles and extended forward, on exterior margin about midway from base to fang, a small tooth directed downward, fang groove horizontal, superior margin with a small tooth or process at median edge, followed by a carina broken in denticles to base of fang, inferior margin with one small sharp tooth and a carina, fang twice as long as groove, sharply bent about middle; *labium* brown, much longer than wide at base, distal half with sides inclined so that tip is almost pointed; *maxillae* not quite twice as long as labium, inclined, distal half greatly widened, so that it is broader than long, lateral margins truncate with upper and lower corners prolonged in a lobe or tooth; *sternum* pale, almost as wide as long, anteriorly twice as wide as labium, sides almost parallel, rounded in front of IV coxae; *abdomen* oval, sides a dull brown, with a median pale stripe, narrow at base, widening on posterior half with indistinct chevrons, entire abdomen covered with hairs of two lengths, short iridescent hairs and scattered long hairs, venter pale, mottled with darker spots, chitinized lobe over opening of spiracle can be faintly seen; *legs*, 1–3–4–2, I pair brown, slightly enlarged, femur flattened laterally, distal half of patella and entire tibia with a thick ventral brush of black hairs and a narrow median dorsal crest of short white hairs, spines, patella, prolateral, 1 small spine, tibia, ventral, 2–2–2, second spine on inner row very near apical spine, the spine on opposite side much nearer middle, third pair are opposite and near base, all spines very small, retrolateral, 1 small, prolateral, 2, metatarsus, ventral, 2–2, prolateral, 2, retrolateral, 2, II pair pale brown, much shorter than I pair, no brush on patella or tibia, spines, patella, prolateral, 1, tibia, ventral, apical, 2, followed by 1r–1r, prolateral, 2, retrolateral, 2, III and IV pairs, pale, III patella and tibia longer than IV patella and tibia, spines numerous, patellae, lateral, 1–1, tibiae with dorsal basal spine, metatarsi with apical whorl

of 4 spines and a median whorl; *palpus* longer than cephalothorax, femur dark, slender and curved, patella and tibia white, with lateral fringes of long white hairs, seen from above tibia very little longer than patella, tibial apophysis slender, not quite as long as diameter of joint, terminal joint small, covered with coarse hairs, bulb extends beyond cavity, embolus a simple curved spine at tip.

Holotype ♂ Dom. Rep.; Loma Rucilla Mountains, Cordillera Central, 5,000–8,000 feet, June 1938, (Darlington)

Paratypes 2♂ Dom. Rep.; Loma Viega, Cordillera Central, south of Constanza, 6,000 feet, August 1938, (Darlington)

Pensacola darlingtoni differs from *P. signata* Peckham, the type of the genus, by the narrower cephalothorax, with higher cephalic portion, much wider sternum, and in the mandibles, by the more excavate median area, with the long bent tooth at the basal portion, a large tooth on the exterior margin, transverse fang groove and the very long fang and in the maxillae, by the truncate lateral margins with an upper and lower tooth.

Pensacola electa spec. nov.

Figures 59, 75, 77

Male. Length, 6.2 mm., ceph. 3.1 mm. long, 2.8 mm. wide, abd. 5.1 mm.

Cephalothorax mahogany-brown, with scattered white scales on sides and a large median spot of white scales which includes the thoracic groove, cephalic portion high, sides rounded, thoracic groove short in a shallow depression between dorsal eyes; *eyes*, anterior row recurved by upper margins, with a row of long bristles above, a.m.e. large, separated by more than a line, a.l.e. about a radius of a.m.e. and separated from them by almost a diameter of a.l.e., small eyes midway between first and third rows, dorsal eyes not on margin, raised from carapace, larger than a.l.e.; *quadrangle* as wide behind as in front; *clypeus* wanting below a.m.e., with no hairs or scales; *mandibles*, 1.7 mm. long, slightly divergent, flat, with middle area slightly corrugated, light brown, with many fine white hairs, distal half abruptly narrowed on median margin to width of fang, on right mandible a faint swelling which is chitinized, above the fang, no median tooth or cusp on outer margin, fang groove oblique with margins of groove indistinct, superior margin with two contiguous teeth near median edge, inferior margin with a large blunt tooth about half way from base of fang, fang longer than groove with distal fifth abruptly bent; *labium* longer

than wide, sides parallel; *maxillae* not twice as long as labium, inclined, tips widened with upper and lateral margins strongly chitinized, upper outer corner produced in a small sharp hook, lower corner with a tubercle projecting from plane; *sternum* yellow, four-fifths as wide as long, slightly narrowed between I coxae; *abdomen* oval, middle dark with a pair of large pale spots about middle, venter pale with dark dots; *legs*, 1–4–3–2, brown, I pair enlarged slightly, metatarsus about twice as long as tarsus, tibia darker because of dark hairs and a short ventral fringe of black hairs, spines, patella, prolateral, 1, tibia, ventral, 2–2–2, second spine on inner row about length of spine below apical, spine on outer row fully twice as far from apical, third pair basal, prolateral, 1, metatarsus, ventral, 2–2, prolateral, 2, retrolateral, 2, II pair much smaller than I pair, with no fringe, spines, patella, prolateral, 1 tibia, ventral, 2–2, distal, 1r, prolateral, 2, retrolateral, 0, metatarsus, ventral, 2–2, III and IV pairs, many spines, patellae, lateral, 1–1, tibiae, dorsal basal spine; *palpus* as long as cephalothorax, dark, with dark hairs, slender, left palpus with a blunt ventral tooth at tip of femur, which may have been from an injury, tibia longer than patella, tibial apophysis not as long as diameter of joint, cymbium longer than tibia, bulb extends beyond cavity in a short lobe, embolus a spiral curve at tip.

Female. Length, 7.0 mm., ceph. 2.6 mm. long, 2.0 mm. wide, abd. 4.5 mm.

Cephalothorax same as in male but paler, no white hairs or scales; *eyes* same as in male; *mandibles* vertical, rather small, fang groove short oblique, superior margin with two contiguous teeth, inferior margin with one large tooth, fang little longer than groove; *labium* pale, longer than wide; *maxillae* pale, inclined, tips slightly widened but no lobes; *abdomen* with a large dark spot that about covers the dorsum, framed in white and faint pale spots that correspond to the larger spots found in male, venter pale with a few dark spots about margins; *legs*, 1–4–3–2, pale, few hairs and no fringes so spines are very distinct, spines as in male; *epigynum*, area as wide as long, a pair of pale ovals, separated by a narrow septum, with a heavily chitinized spot at posterior margin that are probably the openings, beneath the skin and in posterior part of the pale area, dark oval sacs, between margin and fold more dark sacs.

Holotype ♂ Dom. Rep.; Valle Nuevo, southeast of Constanza, Cordillera Central, 7,000 feet, August 1938, (Darlington)

Allotype ♀ Dom. Rep.; Valle Nuevo, southeast of Constanza, Cordillera Central, 7,000 feet, August 1938, (Darlington)

Pensacola electa does not have the median tooth on the mandibles that is found in other Haitian species of the genus, but it has the modified maxillae, the same spacing of spines, similar abdominal markings and the palpus longer than the cephalothorax.

Pensacola maxillosa spec. nov.

Figures 78, 79, 80 84

Male. Length, 6.0 mm., ceph. 3.0 mm. long, 2.5 mm. wide, abd. 3.0 mm.

Cephalothorax pale brown, eye area much darker, a median pale stripe from groove to posterior margin which in life probably is covered with white scales as a few remain about the groove and on thoracic slope, cephalic portion moderately high, sides rounded from anterior margin, posterior margin narrower than anterior, cephalic part short, about two-fifths length of carapace, a recurved depression between dorsal eyes, thoracic groove short and posterior to eyes, eye area flat, thoracic portion slopes gradually for one-third distance and then rapidly to posterior margin, numerous long bristles over anterior eye row and between lateral eyes, a few golden scales in eye area; *eyes*, anterior row of eyes strongly recurved by upper margins, a.m.e. large, separated by a line, a.l.e. about a radius of a.m.e. and separated from them by less than half a radius of a.l.e., small eyes nearer first than third row, dorsal eyes far from margin and subequal with a.l.e.; *quadrangle* as wide behind as in front; *clypeus* wanting below a.m.e., with no hairs or scales; *mandibles* pale, almost vertical, two-thirds as long as cephalothorax, outer margins slightly divergent, inner margins on distal half excavate with a diagonal carina from about the middle on inner margin to base of fang, fang groove oblique, long, margins poorly defined, superior margin with two small contiguous teeth near median edge, inferior margin with a long, strong tooth quite near the base of the fang, fang longer than groove, sinuous and tip bent; *labium* longer than wide, distal half narrowed; *maxillae* almost twice as long as labium, slightly inclined, distal half widened in a lobe, so that greatest width about equals length; *sternum* pale, flat, narrowed between first coxae, sides parallel, fourth coxae touching; *abdomen* oval, with a dark diamond on basal half with posterior end continued as a median stripe to tip, sides pale, entire abdomen with scattered long, dark hairs and many short hairs, venter pale, with faint dark dots, a small lobe over opening of posterior spiracle; *legs*, 1–4–3–2, all patellae except first with lateral spines, I pair slightly enlarged, pale brown, tibia darker

with a dense ventral brush of short dark hairs, femur with ventral fringe of white hairs on retrolateral side, patella with prolateral fringe of white hairs, spines, patella, prolateral, 1, tibia, ventral, 2–2–2, second spine on inner row very near apical spine, opposite spine much nearer the middle of the joint, third pair basal, prolateral, 3, not in line, retrolateral, 2, metatarsus, ventral, 2–2, apical and submedian, apical pair very small, prolateral, 2, retrolateral, 2, both opposite ventral pairs, II pair pale, a few dark ventral hairs on tibia, spines, tibia, ventral, 2 apical, 2 subapical, but not opposite, 1r, prolateral, 3, not in line, retrolateral, 2 III and IV pairs pale, tibiae with dorsal basal spine, metatarsi with apical and submedian whorl; *palpus* as long as cephalothorax, slender, femur pale, bent, tibia longer than patella, tibial apophysis about as long as diamter of the joint, tibia with prolateral fringe of long black hairs, terminal joint pale, not as long as tibia, bulb protruding slightly from cavity, embolus at end of bulb in a complete circle.

Female. Length, 5.6 mm., ceph. 2.7 mm. long, abd. 3.0 mm.

Cephalothorax brown, median pale stripe on posterior half very indistinct, eye area not darkened but black about eyes, thoracic portion not as long as in male, but sides rounded; *eyes* as in male; *clypeus* wanting below a.m.e., with no scales or hairs; *mandibles* brown, short, vertical, flat anteriorly, sides parallel, fang groove short, superior margin with two contiguous teeth near median edge, inferior margin with a plate near base of fang in same position as large tooth in male, fang short with a thick base; *labium* pale, same as in male; *maxillae* pale, not twice as long as labium, outer margin rounded, not produced in a lobe; *sternum* as in male; *abdomen* oval, the dark diamond with a pair of pale spots and the dark areas on posterior half much heavier, dorsum with scattered long dark hairs and short iridescent scales, venter pale with a median faint dark area and many dark spots on sides; *legs*, I left missing, 1–4–3–2, all patellae with lateral spines, I pair not enlarged, femur pale, tibia darker but no ventral brush of dark hairs as in male, spines same as in male, II pair, brown, spines as in male, III and IV pairs, pale, spines as in male; *epigynum* a pale depressed area, divided by a narrow septum which widens at fold, each side can be seen oval spermatheca beneath the skin and a heavily chitinized small opening on the widened part of septum above the fold.

Holotype ♂ Dom. Rep.; Cordillera Central, Loma Viega, south of Constanza, 6,000 feet, August 1938, (Darlington)

Allotype ♀ Dom. Rep.; Cordillera Central, Loma Viega, south of Constanza, 6,000 feet, August 1938, (Darlington)

Paratype ♂ Dom. Rep.; Loma Viega, 6,000 feet, August 1938, (Darlington)

Paratypes ♂ 3 ♀ Dom. Rep.; Loma Rucilla Mountains, 5,000–8,000 feet, June 1938, (Darlington)

Paratypes 3♂ 1 ♀ Dom. Rep.; Loma Viega, 6,000 feet, August 1938, (Darlington) small

The generic position of this species is doubtful. The cephalothorax in both male and female is much more rounded on the sides than in the other species of the genus, the cephalothorax is not as high and the mandibles in the male do not have the long median tooth and the tooth on the inferior margin is very near the base of the fang. A few of the males from Loma Viega, are much smaller and have vertical mandibles, but with the same diagonal carina and the teeth on the fang groove are the same as in the larger specimens. In the female of both large and small forms, the tooth is distinctly bicuspid.

Pensacola montana spec. nov.

Figures 81, 82

Male. Length, 6.0 mm., ceph. 3.1 mm. long, 2.0 mm. wide, abd. 2.5 mm.

Cephalothorax brown, eye area almost black, with a few golden scales, flat, a narrow median pale stripe which includes thoracic groove and extends to posterior margin, lateral pale stripes the same width as the median stripe from p.l.e., covered with white hairs, these stripes fade before reaching posterior margin, cephalothorax moderately high, sides slightly rounded, thoracic sides concave, posterior margin only little narrower than anterior, a recurved depression posterior to dorsal eyes, thoracic groove short; *eyes*, anterior row recurved by upper margins, a.m.e. separated by a line, a.l.e. about equal to a radius of a.m.e. and separated from a.m.e. by less than a radius of a.l.e., small eyes midway between first and third rows, p.l.e. not on extreme margin of carapace, convex, and subequal to a.l.e.; *quadrangle* about as wide behind as in front; *clypeus* very narrow below *a.m.e.*, with no hairs or scales; *mandibles* dark brown, vertical, flat, median margins parallel for about one-third from base, where there is a small sharp tooth, margin below is excavate and ends in a sharp tooth at fang groove, median distal half is concave, exterior margin almost parallel, with a long sharp tooth two-thirds from base, fang groove horizontal, long, superior margin with a sharp tooth at median edge and a very small tooth below, a serrate carina to near base of fang, each serration

bearing a bristle, inferior margin with a sharp tooth almost parallel to groove and a carina to near base of fang, fang much longer than groove and constricted about middle; *labium* brown, longer than wide, tip narrower than base; *maxillae* almost twice as long as labium, inclined, distal half widened so that greatest width equals length, with a small hook or tooth at upper outer corner; *sternum* pale brown, slightly convex, almost two-thirds as wide as long, sides almost parallel, IV coxae slightly separated; *abdomen* oval, with a median pale stripe from base to spinnerets, slightly indented about the middle, much narrower lateral pale stripes from base to spinnerets, entire dorsum with many long coarse dark hairs, venter pale with a narrow median brown stripe from fold to spinnerets; *legs*, II left missing, 1–4–3–2, I pair enlarged, femur dark brown, other joints pale, scantily covered with short dark hairs, femur flattened laterally and ventrally, flat ventral area with a violet iridescence, a retrolateral fringe of short dark hairs and a dorsal basal fringe of short hairs, spines, patella, prolateral, 1, small, tibia, ventral, 2–2–2, small, second spine on inner row, about length of spine from apical, spine on outer row more than twice as far from apical, third pair basal, prolateral, 3, retrolateral, 2, metatarsus, ventral, 2–2, prolateral, 2, retrolateral, 2, both opposite ventral spines, II pair, femur darker than other joints, spines, patella, prolateral, 1 tibia, ventral, 2–2, 1r, prolateral, 3, retrolateral, 1, III and IV pairs, pale, spines, patellae, lateral, 1–1, tibiae with small dorsal basal spine, III metatarsus, distal and median whorls, IV metatarsus, distal, median and basal whorls; *palpus* about as long as cephalothorax, femur dark, slender and bent, seen from above, patella little longer than tibia, tibial apophysis rather small, dark and sharp, terminal joint little longer than tibia, with bulb prolonged in a lobe beyond cavity, embolus confined to tip in a spiral curve.

Female. Length, 7.1 mm., ceph. 3.1 mm., abd. 4.0 mm.

Cephalothorax and *eyes* same as in male but lateral stripes of white scales not as conspicuous; *mandibles* dark brown, vertical, flat, no tooth or cusp on either margin, fang groove slightly oblique, rather short, superior margin with two contiguous teeth on median edge, inferior margin with a bicuspid tooth nearer fang than the teeth on opposite margin, fang slightly longer than groove, with a heavy base and evenly curved; *labium* brown, longer than wide, tip narrowed; *maxillae* not twice as long as labium, inclined, outer margin evenly rounded; *palpi* brown, terminal joint with a thick prolateral fringe of dark hairs; *sternum* same as in male; *abdomen* brown, median pale stripe does not reach base, posterior half broken by four brown tri-

angles, lateral stripes strongly indented about middle, dorsum with many short iridescent hairs, venter pale with a median dark stripe, lateral areas with darker spots; *legs*, 4–3–1–2, brown, I pair slightly enlarged, three terminal joints darker, femur not flattened ventrally, no fringes, spines, patella, prolateral, 1, tibia little longer than patella, spines, ventral, 2–2–2, with second spine on inner row nearer apical, spines about as long as diameter of joint and from a raised base, prolateral, 2, retrolateral, 0, metatarsus, ventral, 2–2, basal pair almost as long as joint, prolateral, 2, retrolateral, 2, II pair, patella, prolateral, 1, tibia, ventral, 2–2–1r, prolateral, 2, retrolateral, 0, metatarsus, ventral, 2–2, prolateral, 2, retrolateral, 2, III and IV pairs, patellae, lateral, 1–1, tibiae with dorsal basal spine, III metatarsus, distal and median whorls, IV metatarsus, distal, median and basal whorl; *epigynum* rather small for the size of the spider, depressed white area wider than long, divided by a narrow septum, each side are round spermatheca with a small dark brown dot at posterior end which may be the opening.

Holotype ♂ Dom. Rep.; Loma Rucilla, Pico del Yaque, 3,000–10,000 feet, June 1938, (Darlington)

Allotype ♀ Dom. Rep.; Loma Rucilla, Pico del Yaque, 8,000–10,000 feet, June 1938, (Darlington)

Paratype ♀ Dom. Rep.; Loma Rucilla, Pico del Yaque, 8,000–10,000 feet, June 1938, (Darlington)

Pensacola peckhami spec. nov.

Figures 83, 85, 86

Male. Length, 4.5 mm., ceph. 2.5 mm. long, 1.8 mm. wide, abd. 2.0 mm.

Cephalothorax chestnut-brown, darker about eyes, pale about thoracic groove, with a faint median pale stripe to posterior margin, lateral margins on thoracic portion covered with white scales, cephalic portion high, a faint recurved depression between dorsal eyes, thoracic groove short, thoracic portion first slopes gradually, then abruptly to posterior margin; *eye area* flat, covers about two-fifths of carapace, anterior row recurved by upper margins, a.m.e. almost touching, a.l.e. less than a radius of a.m.e. and separated from them by a radius of a.l.e., white scales between a.m.e. and on upper margins a row of long bristles with a few orange-red scales, small eyes midway between first and third rows, p.l.e. convex, subequal with a.l.e. and raised from carapace on extreme margin; *quadrangle* not as wide behind as in front; *clypeus* re-

treating, and almost wanting below a.m.e., with a fringe of very long white hairs on margin and a group of three long bristles below a.m.e.; *mandibles* pale brown, two-thirds as long as carapace, median margin parallel for basal half, distal half slightly excavate and concave, median tooth starts at excavation and almost reaches fang groove, long, sharp and directed slightly outward, tooth on exterior margin rather small and inconspicuous, below the long median tooth a small chitinized cusp very near fang groove, fang groove horizontal, superior margin with two contiguous teeth at median margin, followed by a granulate carina to base of fang, inferior margin with one long sharp tooth directed towards the median margin and a short carina from base of fang, fang little longer than groove, distal half slender; *labium* pale brown, longer than wide, with distal half much narrowed; *maxillae* half as long again as labium, distal half widened to form a lobe, so that width almost equals length, lateral margins prolonged in a slight tooth; *sternum* pale, convex, two-thirds as wide as long, anteriorly little wider than labium, lateral margins almost parallel, bluntly rounded in front of IV coxae; *abdomen* oval, sides dull brown, a pale median stripe, narrow at base and much wider at posterior half with indistinct chevrons, entire dorsum covered with small white iridescent scales and a few long hairs, venter pale with opening of posterior spiracle marked by a faintly chitinized line; *legs*, 4–3–1–2, I pair heaviest, brown, femur flattened laterally, constricted at distal quarter with a fringe of long black hairs on retrolateral margin, patella flattened dorsally with a thin ventral brush of black hairs, tibia a darker brown with a thin ventral fringe of short black hairs, metatarsus and tarsus paler, spines, patella, prolateral, 1, tibia, ventral, 2–2–2, middle spine on inner row about length of spine from apical spine, spine on outer row nearer the middle, basal pair small, prolateral, 1, retrolateral, 3, metatarsus, ventral, 2–2, basal pair as long as joint, prolateral, 2, retrolateral, 2, II pair brown, spines, patella, lateral, 1–1, tibia, ventral, 2–2, lateral, 2–2, III and IV pairs with numerous spines, patellae, lateral, 1–1, tibiae with dorsal basal spine, metatarsi with distal and median whorls; *palpus* not as long as cephalothorax, femur curved, basal half dark, distal half with patella and tibia white, from above, patella and tibia the same length, each with lateral fringes of long white hairs, tibial apophysis as long as diameter of joint, terminal joint longer than tibia, bulb protrudes slightly from cavity, embolus a curved dark spine at tip.

Female. Length, 5.0 mm., ceph. 2.5 mm., abd. 2.7 mm.

Cephalothorax darker than in male but with the same pale median

stripe with white and orange scales; *eyes* same as in male; *mandibles* dark brown, vertical, convex, with no indications of teeth on either median or exterior margin, fang groove horizontal and short, superior margin with two contiguous teeth and no carina, inferior margin with a large bicuspid tooth with longer edge nearer base of fang, fang as long as groove; *labium* as in male; *maxillae* one and a half times as long as labium, distal half widened but not extended in a lobe; *sternum* as in male; *abdomen* with the same markings as in male, no chitinized line over opening of posterior spiracle; *legs*, 4–3–1–2, brown, all joints with faint apical and basal dark rings, spines, I pair same as in male, II pair, tibia, ventral, 2–2–2, not opposite or equal, III and IV pairs, same as on male; *palpi* with the same joints white as in the male; *epigynum*, a pair of oval depressions, separated by a very narrow septum, in each depression an oval sac beneath the skin from which a convoluted tube leaves posterior end.

Holotype ♂ Dom. Rep.; Cordillera Central, Loma Rucilla Mountains, 5,000–8,000 feet, June 1938, (Darlington)

Allotype ♀ Dom. Rep.; Cordillera Central, Loma Rucilla Mountains, 5,000–8,000 feet, June 1938, (Darlington)

Paratypes 2♂ Dom. Rep.; Loma Rucilla Mountains, June 1938, (Darlington)

Paratype ♂ Dom. Rep.; Cordillera Central, Constanza, 3,000–4,000 feet, August 1938, (Darlington)

Phidippus C. L. Koch 1846

Phidippus regius C. L. Koch

Figures 87, 92

Phidippus regius C. L. Koch, 1846, 13, p. 146, pl. 454, fig. 1203 "♀ Cuba"

Male. Length, 12.0 mm., ceph. 6.4 mm. long, 4.9 mm. wide, abd. 6.5 mm.

Cephalothorax dark brown, ocular area paler, entire carapace covered with short black hairs, most numerous on thoracic slope, cephalic portion high, widest in eye area, thoracic groove very short, in a depression between dorsal eyes, thoracic slope falls sharply on posterior half; *eyes*, anterior row recurved, so that upper margins of a.m.e. and lower margins of a.l.e. almost form a straight line, cover about three-quarters of anterior margin, a.m.e. separated by about a third of a diameter, a.l.e. less than a radius of a.m.e. and separated from them by a diameter of a.l.e., small eyes one-third nearer first than

third row, dorsal eyes on strong dark tubercles and larger than a.l.e.; *quadrangle* wider behind than in front; *clypeus* about a radius of a.m.e. below a.m.e.; *mandibles* vertical, flat, corrugated, a brilliant iridescent green, shading to violet, median margin divergent, with a swelling above the base of the fang, fang groove strongly oblique, superior margin with two contiguous teeth, near median margin, tooth nearer base of fang larger, inferior margin excavate near base of fang, one large tooth opposite teeth on upper margin, fang slightly longer than groove, from a heavy base and evenly tapering; *labium* longer than wide; *maxillae* almost twice as long as labium, with upper outer corner prolonged in a distinct point; *sternum* dull brown, with many long hairs, little wider than labium at anterior end, ending in an obtuse point in front of IV coxae, a distinct lobe raised above the sternum opposite III coxae; *abdomen* oval, with many long black hairs, basal band of white scales short, not extending on sides, a large triangular spot of white scales about the middle, followed by a pair of widely separated white bars midway to spinnerets, venter a solid black, covered with short black hairs; *legs*, 1–4–2–3, I pair enlarged, femur laterally compressed, femur and tibia dark with a heavy brush of dark hairs, distal half of metatarsus dark, patella nearly as long as tibia, femur with a dorsal crest of black hairs and a ventral brush, patella pale brown with a scant prolateral fringe of long white hairs and a scant retrolateral brush of dark hairs, tibia brown, with a thick ventral brush of black hairs, heaviest on prolateral side, and a few black hairs on dorsal side, metatarsus brown with a scant fringe of long white hairs and many white scales, spines difficult to see because of hairs, patella, prolateral, 1, tibia impossible to see spines, metatarsus, ventral, 2–2, distal and median, II pair much smaller than I pair, fringes same except no white hairs or scales on metatarsus, patella, no spines, posterior pairs with many dark hairs on femora and tibiae, metatarsi pale, spines, III patella, no spine, IV patella, retrolateral, 1, tibiae, no dorsal basal spine; *palpus* shorter than cephalothorax, brown with many dark hairs, terminal joint darker, seen from above patella longer than tibia, tibial apophysis a small dark sharp, incurving hook, cymbium flattened at tip, but with no circle of spicules, bulb large, extending on tibia to patella, embolus a very short dark point at tip, of the same type as *Phidippus audax* but much smaller.

♂ Dom. Rep.; Puerto Plata, July-August 1941, (D. Hurst)

♂ Dom. Rep.; Villa Altagracia, July 1938, (Darlington)

Phidippus regius was described from a female from Cuba. It belongs to the section of the genus best known by *audax* Hentz. The two are

very much alike but probably are not found in the same locality. *P. regius* is much smaller than specimens of *audax* found in the south, and in the specimens seen, have a prolateral spine on the first patella. This is missing in *audax*. In the palpus, the embolus of *regius* is stouter and shorter.

Plexippus C. L. Koch 1850

Plexippus paykulli (Audouin)

Attus paykulli Audouin, in Savigny, Descr. Egypte, Nat. Hist., 1827, 1, p. 272
"♂ Egypte"
Plexippus paykulli Banks, 1903, p. 341.
♀ s Dom. Rep.; Puerto Plata, July 1941, (D. Hurst).

Siloca Simon 1902

Siloca electa spec. nov.

Figures 89, 90, 91

Male. Length, 4.5 mm., ceph. 2.6 mm. long, 1.8 mm. wide, abd. 2.0 mm.

Cephalothorax pale brown, with a vague median paler stripe from groove to posterior margin, darker about the eyes, ocular area and thoracic slope with small white, iridescent scales which shade from white to green in changing lights, cephalic portion high, sides vertical and parallel, eye area flat, a short transverse depression posterior to dorsal eyes from which starts the short thoracic groove, thoracic portion slopes gradually from groove and then falls rapidly to posterior margin; *eyes*, anterior row only slightly recurved by upper margins, with a fringe of yellowish scales and a row of long hairs above, a.m.e. separated by over a line, a.l.e. about a radius of a.m.e. and separated from them by a radius of a.l.e., small eyes nearer third row than to first, dorsal eyes on extreme margin of carapace, convex and slightly larger than a.l.e.; *quadrangle* of eyes slightly narrower behind than in front; *clypeus* less than a radius of a.m.e. and covered with long, soft white hairs; *mandibles* vertical, dark brown, shining, with no hairs or scales, both margins parallel until near the tip, front covered with a sheath that extends beyond mandible almost to fang groove, fang groove horizontal, superior margin with two contiguous teeth at median edge, inferior margin with one fissident tooth opposite teeth on upper margin, fang with a thick base; *labium* longer than wide, tip rebordered, and about half as wide as at base; *maxillae* not twice as

long as labium, almost parallel, distal half dilate, so that width at tip is fully two-thirds length; *sternum* dark brown with a violet iridescence, more than half as wide as long, narrowed between I coxae and pointed between IV coxae; coxae II, III and IV dark brown with a violet iridescence; *abdomen* oval, widest at posterior half, basal half brown, indented about the middle and continued as a pair of widely separated dark stripes, middle area pale, four short parallel dark cross bars above spinnerets, sides dark and covered with coarse black hairs, venter black from fold, posterior spiracle covered by a straight transverse chitinized fold with a finely serrate edge, almost the width of the abdomen and twice the width of the spinnerets, spinnerets closely grouped and superior pair very slender; *legs*, 4–3–1–2, not varying greatly in length, I pair, femur dark brown, shading to an iridescent violet, flattened laterally, dorsal ridge with a crest of colorless hairs on basal half, also flattened ventrally with area depressed and an iridescent violet, with a distinct lateral and basal carina and a retrolateral fringe of long colorless hairs, patella and tarsus pale, tibia and metatarsus brown with many short dark hairs, spines, all patellae with 1 prolateral spine, I pair, tibia, ventral, 2–2–2, prolateral, 2, area between ventral spines with many black hairs, metatarsus, ventral, 2–2, prolateral, 2, opposite ventral spines, II pair, femur same as I pair but ventral fringe is longer, other joints pale yellow, spines, ventral, 2 apical, 1r–1r, prolateral, 3 not in line, retrolateral, 2, metatarsus, ventral, 2–2, prolateral, 2, retrolateral, 2, lateral spines opposite ventral, III and IV pairs, all joints pale, femora with dorsal and lateral small white scales that shade to an iridescent green in changing lights, ventral surface with a mass of black hairs on basal two-thirds, heavier on IV pair, many spines, a dorsal basal spine on tibiae, III and IV tibiae shorter than metatarsi, III metatarsus with apical and submedian whorls, IV metatarsus with apical, submedian and basal whorls; *palpus* short, about half as long as cephalothorax, femur and patella snowy white, seen from above, tibia a little shorter than patella, tibia a dull yellow with many long hairs, especially on ventral side, tibial apophysis about as long as diameter of joint, and projecting at an angle, terminal joint small, not as long as tibia plus patella, bulb extends on tibia as a large lobe, embolus at tip in a spiral curve.

Female. Length, 6.4 mm., ceph. 2.7 mm. long, 2.1 mm. wide, abd. 3.4 mm.

Cephalothorax dark brown, with a median pale stripe from thoracic groove to margin, wide lateral pale stripes from above II coxae to margin, with a few white scales on posterior half of stripes, a few white

scales below lateral eyes and in ocular area, cephalic portion high, ocular area flat, recurved depression between dorsal eyes with a short thoracic groove, thoracic portion slopes rapidly to posterior margin a short distance from groove; *eyes* same as in male; *clypeus* about a line below a.m.e., no white hairs as in male but a fringe on margin; *mandibles* brown, vertical, no shield, sides parallel, fang groove oblique, superior margin with two contiguous teeth, inferior margin with a fissident tooth, end nearer fang base longer, fang with a heavy base, evenly curved; *labium* longer than wide; *maxillae*, tips widened but no lobe as in male; *sternum* pale, narrowed between I coxae; *abdomen* oval, with a pale median stripe from base to spinnerets, stripe narrower at base with irregular margins, sides darker, venter pale; *legs*, 4–3–1–2, anterior pairs heavier, pale, all joints with dark rings, most conspicuous on tibiae and metatarsi, spines, I pair, patella, prolateral, 1, tibia, ventral, 2–2–2, prolateral, 3, not in line, retrolateral, 1, metatarsus, ventral, 2–2, prolateral, 2, retrolateral, 2, II pair, patella, lateral, 1–1, tibia, ventral, 2–2, 1r, prolateral, 3, metatarsus, ventral, 2–2, prolateral, 2, retrolateral, 2, posterior pairs, patellae, lateral, 1–1, tibiae, dorsal basal spine, metatarsi, apical and basal whorls; *palpi* pale, with a dark spot at tip of patella and tibia; *epigynum*, area wider than long with chitinized margins, divided by a narrow septum, openings elongate diagonal ovals at base of depressed area, below are sacs and tubes beneath the skin vaguely outlined.

Holotype ♂ Dom. Dep.; rain forest near Valle Nuevo, Cordillera Central, 6,000 feet, August 1938, (Darlington)

Allotype ♀ Dom. Rep.; Loma Rucilla Mountains, 5,000–8,000 feet, June 1938, (Darlington)

Paratypes 3♂ Dom. Rep.; rain forest near Valle Nuevo, 6,000 feet, August 1938, (Darlington)

Paratypes 3♂ Dom. Rep.; Loma Viega, 6,000 feet, south of Constanza, August 1938, (Darlington)

Paratypes ♂ ♀ Dom. Rep.; Loma Rucilla Mountains, 5,000–8,000 feet, June 1938, (Darlington)

Siloca electa has several rather unusual characters. The mandibles have a sheath-like surface that is unlike anything seen in the family, and the chitinized lip over the opening of the spiracle is larger and more conspicuous than any found, even in Haitian species. The anterior femora with the ventral surface iridescent and surrounded by a carina is not often seen. The retrolateral fringe on the first pair of legs is colorless but the other legs have fringes of black hairs and the entire ventral surface of the posterior pairs is covered with black hairs.

Wallaba Mello-Leitao 1940

Wallaba decora spec. nov.

Fig 88

Male. Length, 5.0 mm., ceph. 2.5 mm. long, 1.7 mm. wide, abd. 2.5 mm.

Cephalothorax dark brown, eye area black, scattered white scales between second and third eye row and on lateral thoracic slopes, cephalic portion rather high, sides sloping out, margin below small eyes and posterior eyes with many short black hairs directed forward, so carapace is widest at that point, recurved transverse depression between dorsal eyes, thoracic groove posterior to p.l.e., posterior portion only a little lower than cephalic for half its length, then it falls abruptly to margin; *eyes*, anterior row strongly recurved by upper margins, eyes equidistant, a.l.e. more than a radius of a.m.e., a thick fringe of short black hairs above eyes, small eyes midway between first and third rows, dorsal eyes subequal to a.l.e. and on margin of carapace, but lateral margin much wider at that point; *quadrangle* slightly narrower behind; *clypeus* dark brown, with no hairs or scales, vertical, more than a radius of a.m.e.; *mandibles* dark brown, rather small, anterior surface flat, no hairs or scales, iridescent, cone-shaped, fang groove very short, superior margin with two contiguous teeth near median edge, inferior margin with one small sharp tooth, fang short with a thick base; *labium* brown, slightly longer than wide; *maxillae* about one and a half times as long as labium, tips widened with a small lobe or tooth on upper outer corner; *sternum* pale brown, three-fourths as wide as long, anteriorly little wider than labium and broadly rounded in front of IV coxae, IV coxae touching; *abdomen* oval, a dull brown with paler muscle spots, and six pale chevrons on posterior half, in life probably entire dorsum covered with small iridescent scales as a few remain about base and sides, scattered long dark hairs, venter pale with three vague gray stripes from fold to spinnerets, a short dark line over opening of posterior spiracle; *legs*, 1–4–3–2, not differing greatly in length, anterior pairs heavier than posterior, all joints with small black hairs and very small white iridescent scales, I pair heaviest, femur, tibia and metatarsus pale brown, patella and tarsus paler, femur flattened laterally and on ventral distal half of retrolateral margin a fringe of long white hairs and shorter dark hairs and on prolateral margin a crest of dark short hairs, spines, patella, 0, tibia, ventral, 2–2–2, middle pair longest, prolateral, 1, retrolateral, 1, both on distal third, joint with fine short hairs, thickest on

prolateral side but hardly enough to call a fringe, metatarsus, ventral, 2–2–2, basal pair very long, prolateral, 1, retrolateral, 1, both very short and opposite distal pair, II pair paler than I pair, spines, patella, prolateral, 1, tibia, ventral, 2–2–2, prolateral, 3, not in line, retrolateral, 2, metatarsus, same as I pair, III and IV pairs pale, spines, patellae, lateral, 1–1, tibiae with small dorsal basal spine, ventral, 1 long, median spine, metatarsi, apical whorl of 4 spines; *palpus* shorter than cephalothorax, femur pale yellow, patella seen from above slightly longer than tibia, both joints white, cymbium brown, with a retrolateral crest of short white hairs, tibial apophysis almost as long as diameter of joint, slender and pressed close to cymbium, cymbium longer than patella plus tibia, bulb extends on tibia and embolus a spiral curve at tip.

Holotype ♂ Haiti; Kenskoff, 5.000–7,000 feet, September 1934, (Darlington)

Paratype ♂ Haiti; La Visite, 6,000–7,000 feet, 16–23 September 1934, (Darlington)

It is with some hesitation that this species is placed in the genus *Wallaba*, as the eyes of the second row are midway between the first and third rows, instead of very near the third row. However, both have the unusual character of three pairs of spines beneath the anterior metatarsi and the first pair of legs longest. *Wallaba decora* undoubtedly belongs with *Cybele albipalpis* Peckham, 1901, from Jamaica, as this species has three pairs of ventral spines on the anterior metatarsi, similar fringes on the first pair of legs but a group of bristles behind the a.l.e., instead of the dark bristles on the lateral margin between the first and second coxae. It does not belong to *Compsodecta* Simon, where it has been placed by some authors.

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PLATES

PLATE 1

PLATE 1

Fig. 1. Agobardus anormalis Keys., male cephalothorax.
Fig. 2. Agobardus anormalis Keys., male, left mandible.
Fig. 3. Agobardus anormalis Keys., left palpus, ventral view.
Fig. 4. Agobardus anormalis Keys., epigynum.
Fig. 5. Agobardus anormalis var. montanus Bryant, male, left mandible, ventral view.
Fig. 6. Agobardus brevitarsus Bryant, male, mandibles, ventral view.
Fig. 7. Agobardus obscurus Bryant, male, right mandible, ventral view.
Fig. 8. Agobardus brevitarsus Bryant, right palpus, ventral view.
Fig. 9. Agobardus perpilosus Bryant, left palpus, ventral view.
Fig. 10. Agobardus perpilosus Bryant, male, left mandible, ventral view.
Fig. 11. Agobardus brevitarsus Bryant, epigynum.

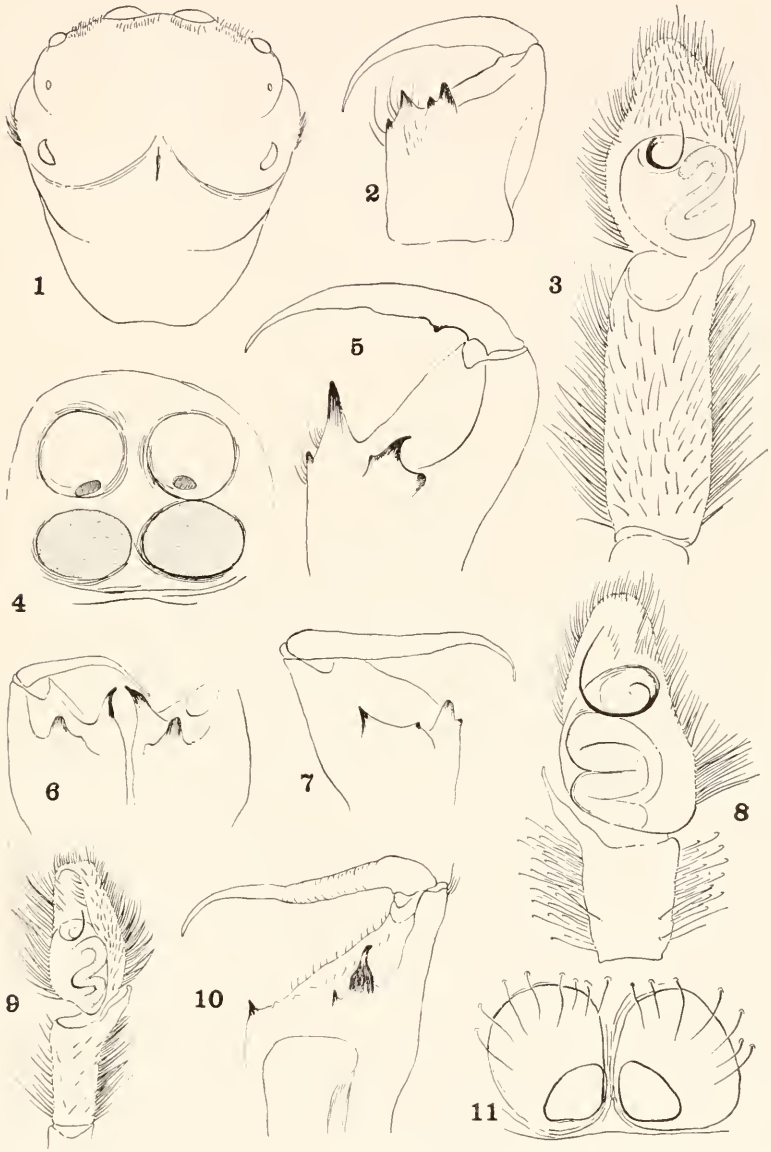
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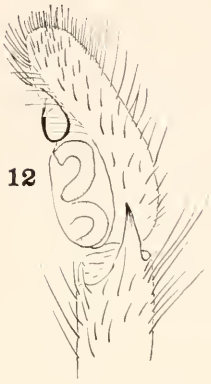
PLATE 2

PLATE 2

Fig. 12. Amycus cambridgei Bryant, left palpus, prolateral view.
Fig. 13. Amycus cambridgei Bryant, epigynum.
Fig. 14. Antillattus gracilis Bryant, left palpus, prolateral view.
Fig. 15. Antillattus placidus Bryant, male, ventral view of mouth parts.
Fig. 16. Amycus cambridgei Bryant, male, dorsal view.
Fig. 17. Amycus cambridgei Bryant, female, ventral view of mouth parts.
Fig. 18. Antillattus gracilis Bryant, male, left mandible, front view.
Fig. 19. Amycus cambridgei Bryant, male, ventral view of mouth parts.
Fig. 20. Antillattus gracilis Bryant, male, left mandible, ventral view.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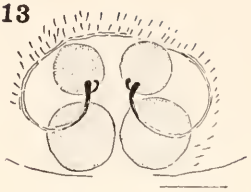
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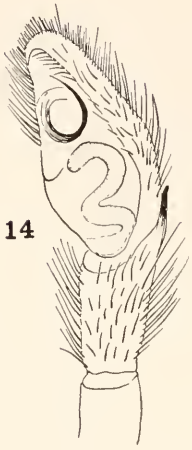
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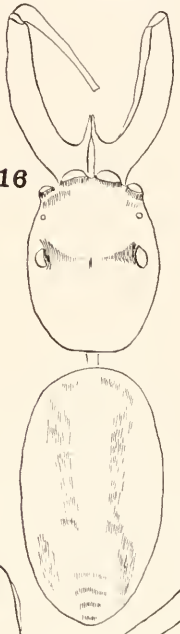
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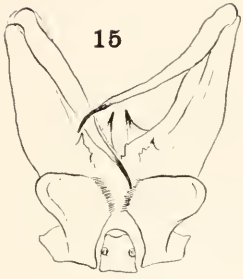
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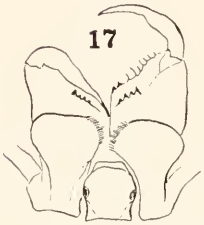
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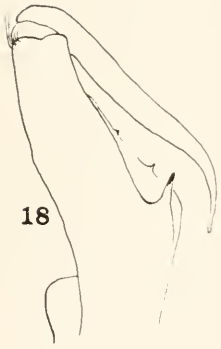
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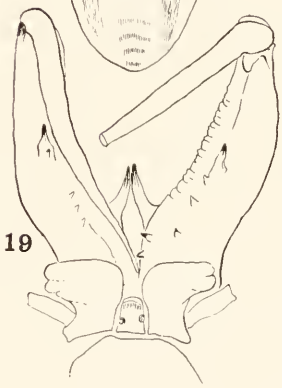
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PLATE 3

PLATE 3

Fig. 21. Bythocrotus cephalotes (Simon), left palpus, prolateral view.
Fig. 22. Commoris modesta Bryant, male, left mandible, ventral view.
Fig. 23. Commoris modesta Bryant, left palpus, ventral view.
Fig. 24. Bythocrotus cephalotes (Simon), epigynum.
Fig. 25. Bythocrotus cephalotes (Simon), left palpus, ventral view.
Fig. 26. Compsodecta haytiensis (Banks), left palpus, prolateral view.
Fig. 27. Corythalia elegantissima (Simon), left palpus, prolateral view.
Fig. 28. Compsodecta haytiensis (Banks), male, mandibles, front view.
Fig. 29. Compsodecta peckhami Bryant, male, ventral view of mouth parts.
Fig. 30. Corythalia elegantissima (Simon), palpus, ventral view.
Fig. 31. Compsodecta peckhami Bryant, male, right mandible, ventral view.
Fig. 32. Compsodecta haytiensis (Banks), male, ventral view of mouth parts.
Fig. 33. Compsodecta haytiensis (Banks), epigynum.

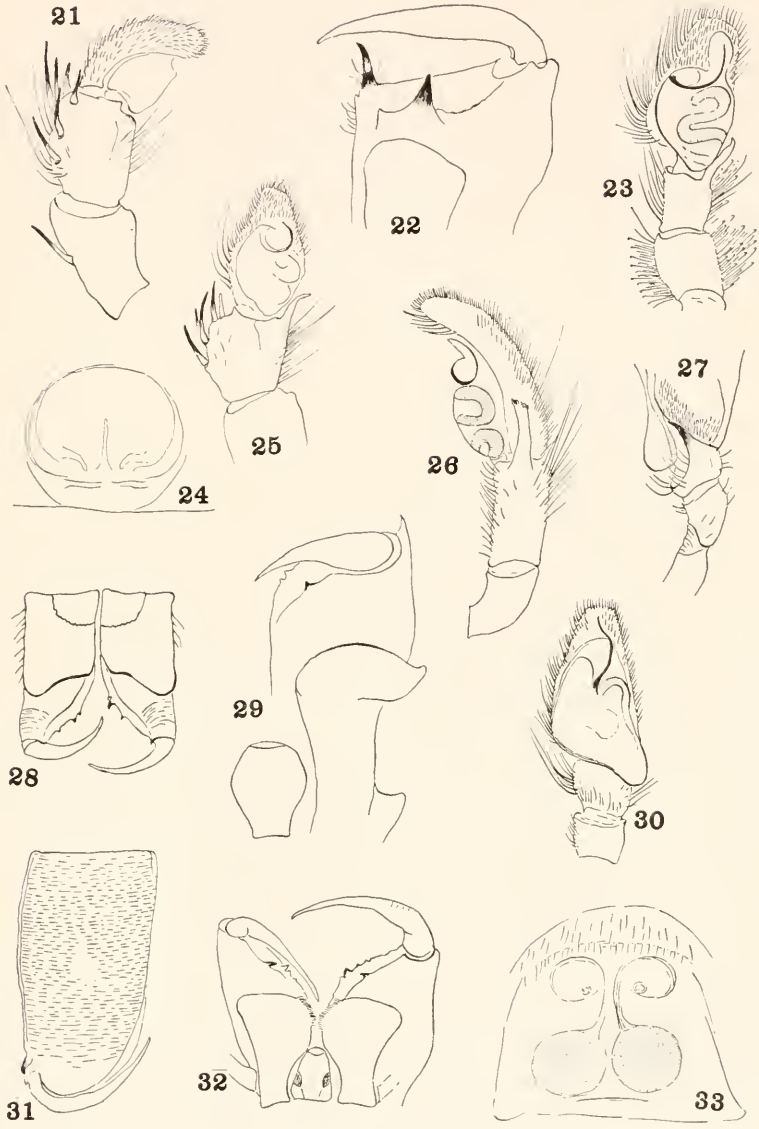
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PLATE 4

PLATE 4

Fig. 34. Descanso formosus Bryant, left palpus, ventral view.
Fig. 35. Compsodecta peckhami Bryant, left palpus, prolateral view.
Fig. 36. Descanso magnus Bryant, epigynum.
Fig. 37. Corythalia locuples (Simon), left palpus, ventral view.
Fig. 38. Corythalia locuples (Simon), left tibial apophysis.
Fig. 39. Dinattus heros Bryant, left palpus, ventral view.
Fig. 40. Descanso montanus Bryant, left palpus, prolateral view.
Fig. 41. Descanso formosus Bryant, male, dorsal view.
Fig. 42. Parathiodina compta Bryant, left palpus, prolateral view.
Fig. 43. Corythalia locuples (Simon), epigynum.
Fig. 44. Corythalia elegantissima (Simon), epigynum.
Fig. 45. Parathiodina compta Bryant, left palpus, ventral view.

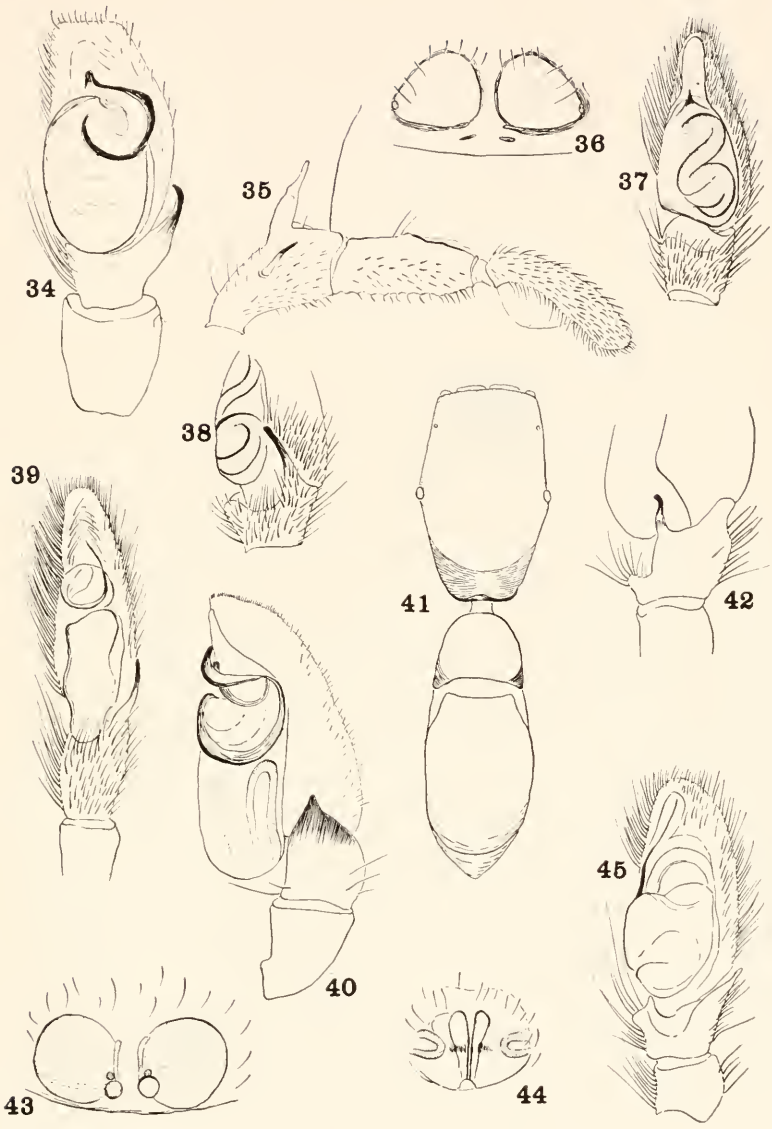
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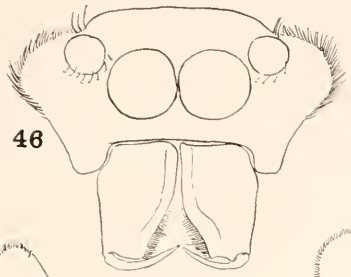
PLATE 5

PLATE 5

Fig. 46. Dinattus minor Bryant, male, front view.
Fig. 47. Dinattus heros Bryant, epigynum.
Fig. 48. Nebridia manni Bryant, left palpus, ventral view.
Fig. 49. Metacyrba pictipes Banks, left palpus, ventral view.
Fig. 50. Dinattus heros Bryant, male, front view.
Fig. 51. Dinattus erebus Bryant, epigynum.
Fig. 52. Dinattus minor Bryant, male, cephalothorax.
Fig. 53. Descanso formosus Bryant, epigynum.
Fig. 54. Dinattus heros Bryant, male, cephalothorax.
Fig. 55. Dinattus minor Bryant, left palpus, ventral view.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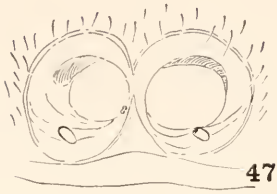
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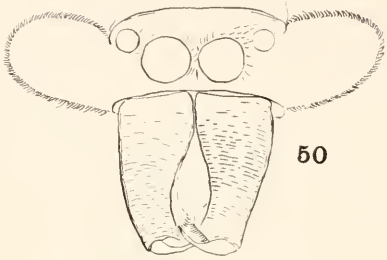
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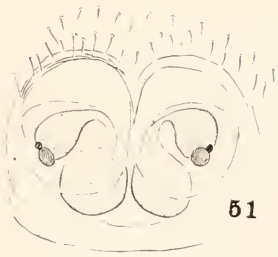
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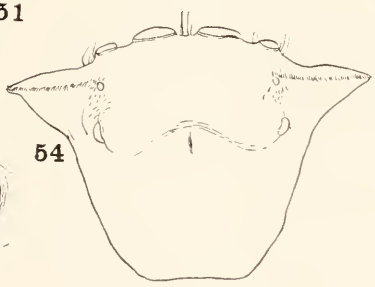
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PLATE 6

PLATE 6

Fig. 56. Metaphidippus prudens (Peckham), left palpus, ventral view.
Fig. 57. Metaphidippus prudens (Peckham), left palpus, tibial apophysis.
Fig. 58. Oningis crassus Bryant, left palpus, prolateral view.
Fig. 59. Pensacola electa Bryant, male, mandibles, front view.
Fig. 60. Oningis crassus Bryant, male, mandibles, front view.
Fig. 61. Nebridia manni Bryant, epigynum.
Fig. 62. Nebridia mendica Bryant, male, cephalothorax.
Fig. 63. Metaphidippus prudens (Peckham), epigynum.
Fig. 64. Nebridia manni Bryant, male, cephalothorax.
Fig. 65. Nebridia mendica Bryant, left palpus, prolateral view.
Fig. 66. Nebridia manni Bryant, male, mandibles, ventral view.
Fig. 67. Oningis crassus Bryant, epigynum.
Fig. 68. Parahentzia mandibulata Bryant, left mandible, front view.
Fig. 69. Parahentzia mandibulata Bryant, left palpus, prolateral view.

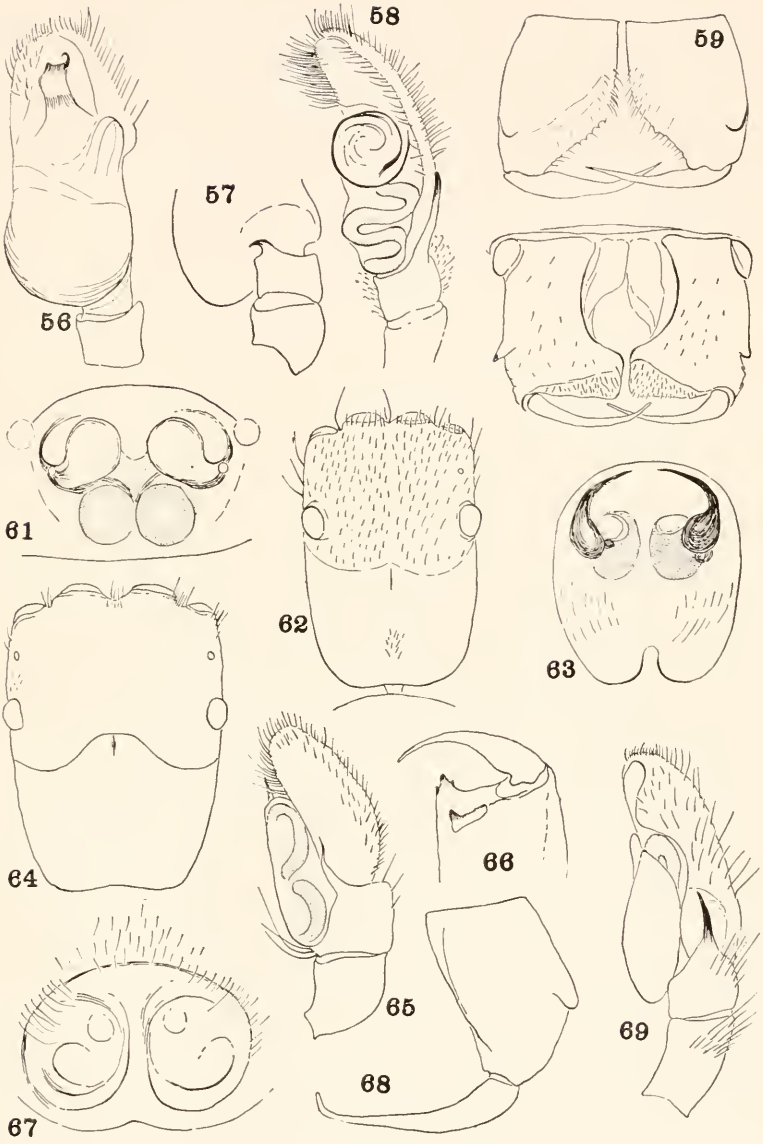
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PLATE 7

PLATE 7

Fig. 70. Oningis armatus Bryant, left palpus, prolateral view.
Fig. 71. Parahentzia mandibulata Bryant, male, ventral view of mouth parts
Fig. 72. Pensacola darlingtoni Bryant, male, front view of mandibles.
Fig. 73. Oningis armatus Bryant, epigynum.
Fig. 74. Pensacola darlingtoni Bryant, left palpus, ventral view.
Fig. 75. Pensacola electa Bryant, epigynum.
Fig. 76. Pensacola darlingtoni Bryant, male, ventral view of mouth parts.
Fig. 77. Pensacola electa Bryant, male, ventral view of mouth parts.
Fig. 78. Pensacola maxillosa Bryant, male, front view of mandibles.
Fig. 79. Pensacola maxillosa Bryant, male, ventral view of mouth parts.
Fig. 80. Pensacola maxillosa Bryant, female, ventral view of mandibles.

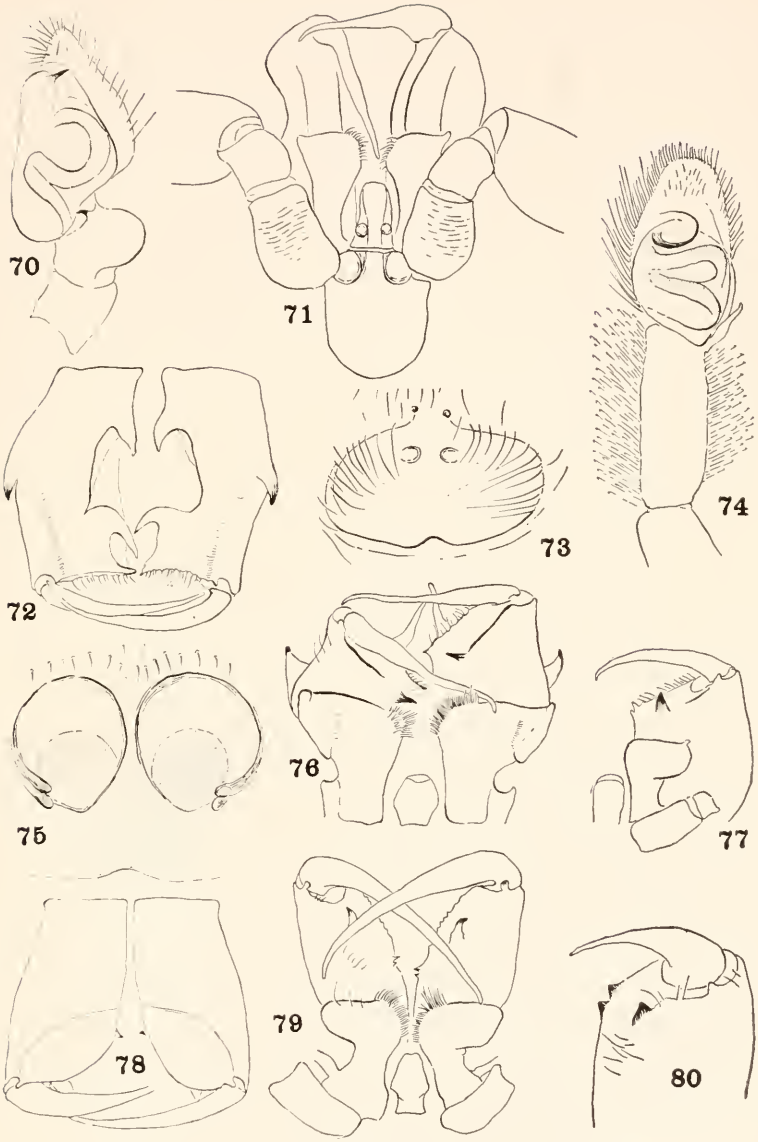
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PLATE 8

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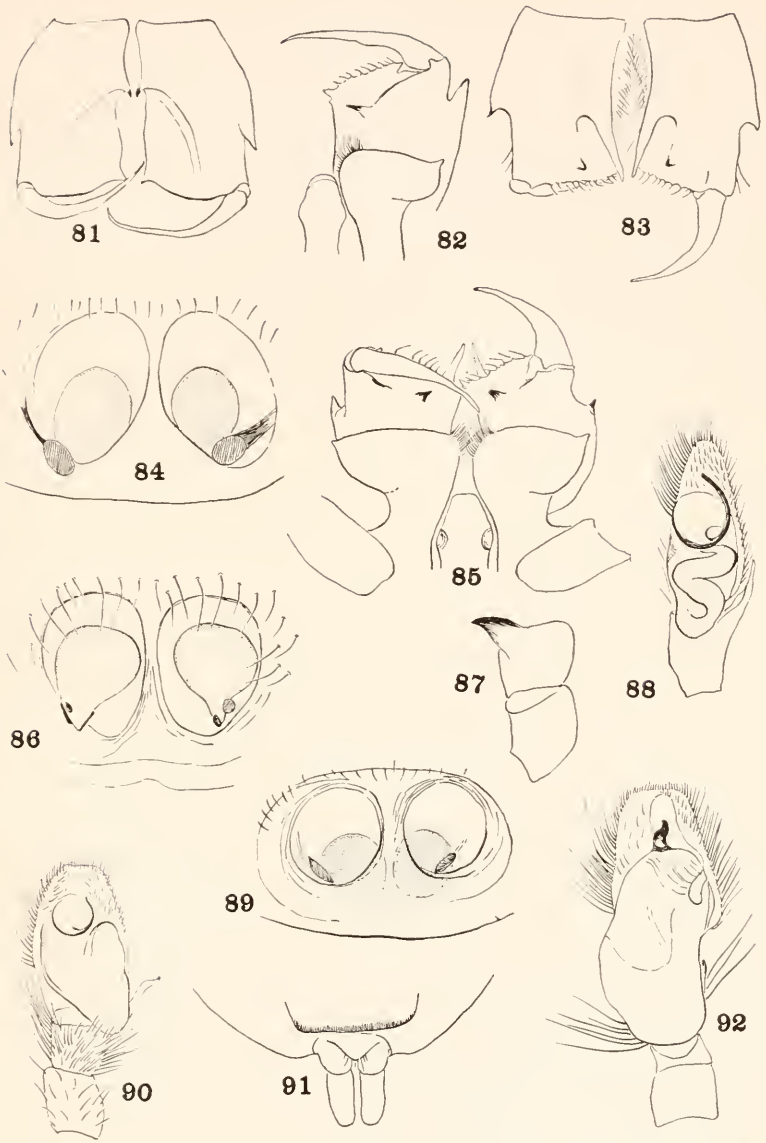
Fig. 81. Pensacola montana Bryant, male, mandibles, front view.
Fig. 82. Pensacola montana Bryant, male, ventral view of mouth parts.
Fig. 83. Pensacola peckhami Bryant, male, mandibles, front view.
Fig. 84. Pensacola maxillosa Bryant, epigynum.
Fig. 85. Pensacola peckhami Bryant, male, ventral view of mouth parts.
Fig. 86. Pensacola peckhami Bryant, epigynum.
Fig. 87. Phidippus regius Koch, left tibial apophysis.
Fig. 88. Wallaba decora Bryant, left palpus, ventral view.
Fig. 89. Siloca electa Bryant, epigynum.
Fig. 90. Siloca electa Bryant, left palpus, ventral view.
Fig. 91. Siloca electa Bryant, male, opening of posterior spiricle.
Fig. 92. Phidippus regius Koch, left palpus, ventral view.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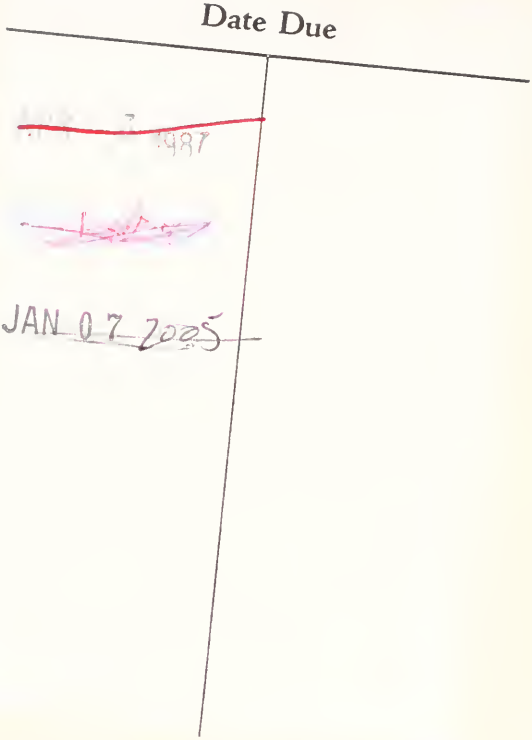

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